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Understanding Human Emotions

Course Guidebook

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Lawrence held postdoctoral positions at Harvard Medical School and Harvard University. During this time, he won two Certificates of Excellence and Distinction in Teaching. He has since taught at Skidmore College, Columbia University, and New York University, where he won the Golden Dozen Teaching Award in 2020. He was also included in the *Intro to Psychology* course created by Outlier.

In addition to his teaching and research, Lawrence is a psychotherapist and holds licenses in Massachusetts, Maine, and New York. He has clinical experience treating clients across many diagnostic categories, age ranges, and ethnicities. He also specializes in treating adolescents and adults with mood disorders, such as depression and anxiety; emotional disorders, such as borderline personality disorder; and substance abuse disorders. Many of his treatment methods are drawn from cognitive behavioral therapy, dialectical behavior therapy, and motivational interviewing. ■

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Understanding Human Emotions

In large part, human emotions define the most salient and memorable moments of our lives. We feel gratitude when someone cares for us without expecting anything in return. We feel sadness when the goal that we worked hard to attain ends in failure. But how do we define these feelings? As a feeling or motivational state? By its antecedent cause or event? By its characteristic facial or vocal expression? More importantly, what are emotions for, if anything? This course will provide answers to these questions, with the aim of helping you understand the role that emotions play in your everyday life.

The course begins with a review of the early conceptualizations of emotion. Although many of these conceptualizations are outdated, several remain influential to emotion researchers today. This is followed by an introduction to evolutionary theory and the large influence it has on how we view emotions.

Emotional states are largely internal and unobservable. The following lecture, on emotions and the body, describes what we have learned from the many physiological and behavioral studies of emotion.

The next several lectures focus on the interpersonal characteristics of emotions. The first focuses on the social aspects of emotions; that is, how they are communicated and influence the behavior of others. The second lecture focuses on the expression of emotion in the body, voice, and face. The third lecture relates to culture and how emotions vary and are influenced by cultural factors.

This is followed by a lecture on the development of emotions. Emotions—and the characteristics of emotions—are felt, expressed, and interpreted differently across the life span. The emergence of emotions and the characteristic expressions of emotions are discussed.

Thoughts and feelings commonly co-occur. The next lecture focuses on cognition and emotions. Surprisingly, emotions often lead to rational behaviors that are beneficial for both ourselves and others.

Emotions can take a toll on us. This is especially true for those who suffer from emotional and mood disorders. The lecture on emotional disorders addresses depression and anxiety.

The final two lectures focus on specific emotions. The first of these attempts to reverse engineer disgust and anger. The second attempts to provide an explanation for companionate and compassionate love.

Upon completing this course, you will never experience your emotions and the emotions of others the same way again. You'll discover a newfound appreciation for those feelings that underscore the most important moments of our lives.

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1

The Science and Philosophy of Emotions

With a working definition of emotions, we'll begin to sculpt a more and more accurate depiction of what they are, how they came to be, and why they still exist.

Early Scientific Approaches to Emotions

We all have a tacit understanding of what emotions are even though we've never been explicitly told what they are. For example, if someone tells you that they're feeling happy, you know that they're in a positive state and you have some idea about what that experience feels like. However, we often can't put a definition of an emotion like happiness into words when we're asked to do so.

The most influential early ideas about emotions came from Charles Darwin, William James, and Sigmund Freud.

- Charles Darwin* suggested not a communicative function but a physiological function of the emotional expressions. He argued that facial expressions prepared organisms to respond to environmentally recurring stimuli by regulating sensory intake. He also argued that emotional expressions come from habits that were useful in our evolutionary past and that are present now as vestiges of that past. He proposed that emotional expressions are based on mechanisms like reflexes that are still present today. This is true whether or not they are useful.†
- William James‡ focused on the nature of the emotional experience itself—that is, the ways in which emotions move us in bodily ways. It is commonly thought that we feel an emotion, and that emotion motivates us to act in a certain way. Instead, James proposed that the emotion *is* the feeling. So, to James, the emotion itself is the pattern of

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* Darwin wrote *The Expression of the Emotions in Man and Animals* in 1872, and it quickly became the most important book on emotions that had yet been written.

† For example, when we get goosebumps when we are either aroused or excited in some way, we are expressing our now-useless vestige of our hair standing on end. In the past, this was useful to make us look more formidable and/or less vulnerable to others.

‡ James—thought by many to be the father of American psychology—in his 1890 book *The Principles of Psychology*, wrote: "bodily changes follow directly [from] the perception of the exciting fact and that our feeling of the same changes as they occur is the emotion."

responses in the body. James's approach guided the study of emotion in two important ways. First, James's focus on experience led to the idea that our experience of many emotions involves changes in the autonomic nervous system,§ which has led to important work on the physiological changes associated with emotions. Second, James proposed that emotions give color and warmth to experiences; he argued that everything would be pale without this. This led to work on the ways that emotions affect thoughts/cognitions. James's theory is often referred to as the James-Lange theory, because psychologist Carl Lange independently published the same ideas in the 1800s.

Two theories of emotion that contrast with the James-Lange model are the Cannon-Bard model and Schachter and Singer's two-factor theory.

- According to the Cannon-Bard model, stimuli simultaneously trigger activity in the body and the emotional experience in the brain. So, in contrast to the James-Lange model, the experience doesn't directly come from the body but from the environmental stimulus, which triggers a response in both the brain and the body simultaneously.
- Schachter and Singer's two-factor theory suggests that different emotions are merely different interpretations in a single pattern of bodily activity—that emotions are based on inferences about the causes of physiological arousal. They would argue that people have the same physiological reactions to all emotional stimuli and that people interpret that reaction differently on different occasions. Recent evidence suggests that emotional experiences are more than just interpretations of the same bodily state; that is, much work has found specific physiological reactions for specific emotional states.

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§ This is the part of the nervous system that affects systems in the body such as the heart, blood vessels, lungs, stomach, and sweat glands.

- Following from his theory of psychoanalysis, Sigmund Freud suggested that a person's emotional life in adulthood is strongly influenced by the relationships they had as a child. This idea was the foundation of the work of John Bowlby, who developed the theory of attachment, which describes how early attachment relationships affect the propensity to experience emotions later in life. Freud also had a huge influence on the work of Richard Lazarus, who proposed that emotions derive from how we appraise events in our environment in relation to our goals.

Even Earlier Philosophical Approaches to Emotions

While Darwin, James, and Freud laid important foundations in the study of emotions, they weren't the first in the Western tradition to think about emotions. Philosophers grappled with the nature of emotions and influenced our current conception of emotions.

Aristotle offered some of the first systematic analysis of emotion. During his time, many people assumed that emotions just happened to us. However, Aristotle's fundamental insight was that emotions depend on what we believe. In this view, emotions are the result of evaluative judgments of events in the world. If this is the case, we are responsible for our emotions because we are responsible for our beliefs. Aristotle described how judgments give rise to different emotions in his book *Rhetoric*.

In René Descartes's 1649 book, *The Passions of the Soul*, he claimed that the six fundamental emotions occur in the thinking aspects of ourselves, which he called the soul. At the same time, he said that emotions are closely connected to our bodies. He was one of the first to argue that emotions serve important functions. He also noted that emotions are usually functional but can sometimes be dysfunctional.

René Descartes is generally regarded as the founder of modern philosophy and the scientific view of the world.

Psychological Approaches to Emotions

Although these early pioneers laid the foundation for the study of emotions, this came to a halt in the first half of the 20th century, when behaviorism emerged. Behaviorism is a school of thought that saw only overt behavior as worthy of psychological inquiry. This was in part a reaction to psychoanalytic theory, which spoke of ideas that were difficult to quantify and disprove, such as the id, ego, and superego.

> **"We all know that emotions are useless and bad for our peace of mind and our blood pressure."**
>
> **—B. F. Skinner**

One of the leaders of behaviorism was B. F. Skinner. In his 1948 novel, *Walden Two*, Skinner argued that anything that was not directly observable—that was not objective and quantifiable—didn't have a place in psychology. However, since this time, the scientific study of emotions has come into its own in the brain sciences, psychology, and other social sciences, such as sociology and anthropology.

Two important figures that emerged during this time were Magda Arnold and Silvan Tomkins. Most people today assume that emotions derive from people's appraisals of events; that is, the typical emotions arise when a person perceives or thinks about something that is relevant to something important to them. Arnold developed this idea further by stating that an emotion relates to the self and to an object, saying that appraisals first involve either an attraction to or a repulsion from some object and whether the emotion is positive or negative. She also said that further distinctions come after the appraisal, and they depend on two things: whether the object of the emotion is present and whether there are difficulties in acting. She argued that impulsive emotions arise if there is no difficulty in attaining or avoiding an object. She also argued that emotions of contention arise when there are difficulties in acting. Furthermore, she argued that particular emotions arise according to these appraisals. For example, the impulsive emotion of love comes when the object is judged to be suitable and if it is present.

In several books from the 1960s, Tomkins claimed that affect is the primary motivational system. He stated that emotions are the amplifiers of drives—referring to hunger, thirst, and sex. This was a radical idea at the time because it had long been assumed that hunger, thirst, and sex were the primary determinants of behavior. Tomkins argued that this wasn't so. He said, "This is a radical error. The intensity, the urgency, the imperiousness, the oomph of drives is an illusion." The illusion is created by the misidentification of the drive signal with its amplifier, or its affective response. What Tomkins meant by *drive signal* was a neural message about some event, such as a signal of a potential sexual partner. What Tomkins meant by *drive amplifier* was the oomph, or strong attraction to a person. In this case, we are aware of our strong attraction to a person but not the drive signal itself.

Building a Framework for What Emotions Are

With all these early ideas in mind, we're prepared to build a framework for what emotions are. This includes how appraisals influence emotions, how emotions are tied to the body, and how emotions are expressed. Each of these aspects has formed how we think of emotions today.

Following Aristotle and Arnold, we recognize that emotions arise as a result of how we appraise the events in our environment. The most typical events are social, but they can also include bodily responses—e.g., when we have a heart palpitation or feel butterflies in our stomachs. Following Darwin, we recognize that emotions involve subjective feelings and expressive behavior. And following James, we recognize that emotions involve bodily responses and tendencies to act in certain ways.

In summary, emotions occur in response to some event. This event can be in the world, in our minds, or in our bodies. And these events have consequences regarding our goals or values. We also know that emotions involve different aspects of ourselves. These include our experiences, thoughts, bodily changes, expressions, perceptions, and motivations or actions. And finally, emotions create a motivation for us to behave in one way as opposed to not behaving in any way or behaving in any other possible way. Much of this course will be spent sculpting this framework to be more and more precise in light of the extant literature and research findings.

With this framework in mind, how do emotions differ from other feeling states, such as moods or dispositions? Emotions are generally used to describe states that last for a limited amount of time—perhaps seconds or minutes.

Facial expressions, which are tied to emotions and the experience of emotions, typically last for seconds. Bodily responses, which are also tied to emotions, generally last for seconds or minutes.

It has been argued that people are always aware of what triggered an emotion. For example, people are scared because they saw a cockroach or happy because they saw their best friend. It's rare that we don't know what the trigger of an emotion is. This contrasts with moods, which are states that last for hours, days, weeks, or perhaps a lifetime. Some examples are depression, anxiety, and mania. Unlike emotions, we aren't always aware of what causes a change in mood. For example, we might be sad because of a change in seasons and be completely unaware of that cause.

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How Emotions Evolved

The theory of evolution by natural selection can greatly aide our understanding of emotions because it describes their functions. It describes not only their design but also what problems they were designed to solve. Evolution provides the theoretical framework that allows us to have working definitions of emotions. We can then better understand why we feel certain emotions in different scenarios.

How Evolution Works

The universe was created about 10 to 15 billion years ago. At that time, the only science was physics. Physics generated chemistry, chemistry produced biology, and biology led to psychology. This means that to understand chemistry, you need to know a little bit about physics, and to understand biology, you need to know a little bit about chemistry, and to understand psychology, you need to know a little bit about biology. That's where we'll start—by learning a little bit about biology, as described by the evolutionary biologist Richard Dawkins in *The Selfish Gene*.

"Is it not reasonable to anticipate that our understanding of the human mind would be aided greatly by knowing the purpose for which it was designed?"

—George Williams

The early years of the universe were simple. Still, even a simple version of a complicated universe is difficult to describe. The early universe is populated by stable things that are permanent or frequent enough to deserve a name, such as a rock, an ocean wave, or a galaxy. By definition, things tend to settle into a stable configuration and stay there. For example, soap bubbles are stable configurations of thin films of liquid filled with a gaseous center. Elements and molecules arrange in stable configurations for their environment. Before life on earth, early natural selection was based on stable forms and a rejection of unstable ones. Something as stable as a human being could not have come simply from the selection of stable things and a rejection of unstable things. This is where we look toward Darwin's theory of evolution by natural selection.

We don't know exactly what chemical compounds were present on earth before life. However, we can be reasonably sure that they included water, carbon dioxide, methane, and ammonia, as they are present elsewhere in our solar system. Chemists have put these simple substances together in beakers and flasks and have applied ultraviolet light analogous to the sun's rays and electricity analogous to lightning. And they found that after a few weeks, they get a brownish, goopy soup containing molecules that are more complex than the simple elements that were originally put in them. Using this process, chemists have found amino acids, which create proteins. They've also found purines and pyrimidines, which create DNA.

After much time, a molecule formed that has an amazing ability to make a perfect copy of itself. With the birth of this replicator, a new kind of stability arose. The replicator spread its copies quickly throughout the goops and soups and seized the earth until the smaller component molecules that it used as food became a scarce resource.

At this point, it seems that we have a population filled with exact replicators. But, importantly, occasional mistakes in the copying process make evolution by natural selection possible. As miscopies dispersed, some varieties were inherently more stable than others. Those replicators with the most stability had three important properties: longevity, or those that lived the longest; fecundity, or those that multiplied at the highest rates; and accuracy, or those that replicated with the highest fidelity.

Because the earth's size is finite, it cannot support an infinite process of replication. Furthermore, resources are scarce and precious, so there was competition for them. There was a struggle for existence, though the replicators didn't even know it. As time went on, the copying errors were cumulative and progressive.* In this way, the replicators increased their own viability and reduced that of their rivals. Perhaps some broke down and utilized molecules of the rivals. You can think of these as proto-carnivores. Other replicators likely discovered methods of protection, by building a physical wall of protein around themselves. Surviving replicators were the ones that ended up building the best mechanisms in which to thrive, eventually leading to living cells. Billions of years of these processes led to more efficient machines.

What has become of these replicators? You won't find them floating loose in the goops and soups of the seas. They've long since given up that reckless way of life. Now, they're grouped together in huge, animated marionettes, protected from many of the dangers of the direct environment. And they only communicate with the outside world by torturously indirect routes.

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* It was a bit like playing the telephone game, where one person starts with a message that they whisper to their neighbor. By the time the message reaches the last person playing the game, it is often completely different. However, it remained intelligible to everyone playing the game along the way.

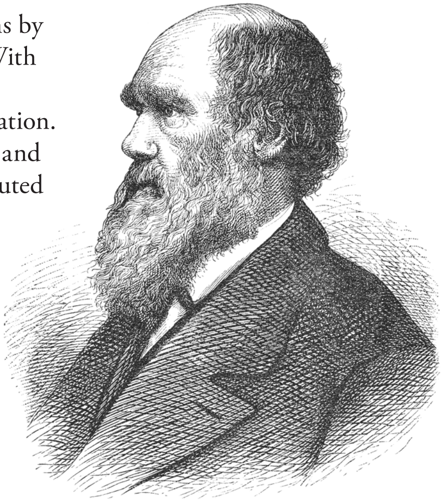
Today, they reside in us. They created our bodies and minds—our very existence—to ensure their own preservation. We now call them genes, and we are their method of survival.

In this way, you can think of evolution as a contest among genes. This is a game in which the players are not us but the genes that created us. The objective of the game for the genes is simply to stay in the game. A gene wins when it is passed on to the next generation. A gene loses when the body dies without reproducing.

This explains how every living thing came to be, as well as the ultimate purpose of being. It is the replication of the genes inside of us.

Darwin's Argument

Darwin proposed that evolution happens by natural selection and sexual selection. With natural selection, the idea is that nature chooses between alternatives each generation. Those choices that best further survival and reproduction will most likely get distributed to posterity. So, natural selection is the nonrandom selection of randomly created variance within the population.



Darwin first noted that natural populations could grow exponentially. If each female elephant had six offspring, after 500 years, this elephant would have 15 million offspring. After 1,000 years, the earth would be a ball of elephants expanding at the speed of light! Despite this prospect, natural populations are fairly stable—they don't grow exponentially. This means that organisms must be reproducing at different rates.

The theory of evolution by natural selection is one of the most powerful theories in all of science: It is a simple idea that explains so very much.

As such, many members do not leave as many descendants. This is due to the finite size of the earth and the limited resources available. So, any population that continues to grow will eventually reach a point where resources are inadequate to support the reproduction of all.

Darwin then argued that those best adapted to the prevailing surroundings would leave the most descendants. The reproductive rates among organisms are not random. Nature selects those best able to cope with the environment. Those unable to cope with the environment produce fewer, or no, offspring. And due to genetics, offspring are like their parents. Advantages that allowed organisms to reproduce are passed on, while disadvantages that caused organisms to fail to reproduce are not passed on. Thus, offspring begin with the advantages of their ancestors. Natural selection thus manufactures individuals that are well adapted to the environment over many generations. Advantages become more common in the population over time, while disadvantages become less common in the population over time or disappear entirely.

The way that natural selection creates advantages is by building adaptations, which are inherited. The species reliably develops these adaptations as natural selection facilitates their reproduction, directly or indirectly, during its evolution time. We—and all living things—are filled with adaptations for solving recurrent problems faced by our ancestors.

Adaptive Problems Solved by Emotions

Adaptations are parts of our bodies and minds that specifically function to solve different adaptive problems faced by our predecessors. These include face recognition, foraging, mate choice, heart rate regulation, sleep management, and predator vigilance. The existence of these microprograms creates two additional adaptive problems:

- Programs that are individually designed to solve specific adaptive problems could, if activated concurrently, provide outputs that dispute one another. In this way, they might interfere with or nullify the functions of one another. For example, sleep and flight from a predator require jointly inconsistent actions, calculations, and physiological conditions. Sleep is difficult when your mind and heart are racing. This is not by chance.
- Many adaptive issues are resolved using multiple programs.

To avoid these two adaptive problems, the mind must be equipped with superordinate programs to direct other programs. These superordinate programs would need to override some programs when others are activated as well as coordinate the programs into the proper configuration.

From an evolutionary perspective, this is what emotions are. The argument is that, to behave functionally according to evolutionary criteria, the mind's and the body's many subprograms need to be arranged so that their mutual product at any given time is functionally coordinated, rather than discordant and counterproductive.

So, from this perspective, an emotion is a superordinate program whose purpose is to control the actions and interactions of subprograms. These subprograms include perception, attention, inference, learning, memory, goal choice, motivational priorities, and categorization and conceptual framework.

Note that emotions can't be reduced to any one category of effects for this reason. In other words, you can't differentiate every emotion from every other emotion by a single property, such as a facial expression, physiological state, or antecedent event.

Evolutionary Hypotheses for Emotions

What follows is a list of emotions and an evolutionary hypothesis for what they might motivate us to do.

- Joy is hypothesized to facilitate strong social bonds, appreciate mutually beneficial actions, and reinforce efforts that increase reproductive fitness.
- Sadness strengthens social bonds, promotes deeper reflection, and generates empathy and altruistic behavior from others.
- Anger communicates threat, mobilizes and sustains energy at high levels, and may prevent aggressive behavior from others.
- Disgust motivates us to remain clean and sufficiently sanitary, protects us from harmful substances, and helps ensure that we don't violate social norms.
- Fear motivates escape from dangerous situations and focuses our attention on the source of the threat.

Each of these emotions typically arises in specific situations and as the result of specific interpretations of situations with the aim of motivating behavior that increases reproductive fitness.

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How the Body and Emotions Influence One Another

Emotions are inherently tied to the body. Emotions orchestrate changes in our minds and bodies that motivate us to behave in ways that are adaptive in the specific situations that we find ourselves in.

Emotions and Physiological Responses

William James's 1884 description of emotions put a large focus on bodily changes. Most of his contemporaries maintained that the occurrence of an emotion was in reply to an emotionally eliciting situation—that is, some event happens in the environment, and that event elicits the emotion we feel. However, James argued that the beginnings of the emotional occurrence were in the body itself. For him, the sequence of emotions went in this order: There is an eliciting event in the environment, and then our bodies respond to that event. Finally, James stated that the experience of the emotion is the perception of that bodily response.

James thought that every emotion involves a distinct pattern of physiological responses, which he called bodily reverberation. These responses included patterns of breathing, blood flow, heart palpitations, trembling, and goosebumps. They include activity in certain glands, such as the lacrimal glands that produce tears. Also involved are muscle movements of different kinds, such as those that prepare for fighting, fleeing, or fainting. They also include organs, such as the liver and the stomach. James said that emotion is the perception of all these bodily reverberations in different systems of the body that lie below our brain stem.

When James spoke of bodily reverberations, he was referring to what scientists now call the autonomic nervous system, the neuroendocrine system, and the immune system.

William James was not without his critics. Chief among them was Walter Cannon, who argued that physical changes are manufactured by the brain and that many different emotions involved the identical general activation of the sympathetic nervous system. Despite their disagreements, James and Cannon were both right in associating emotions with bodily responses.

The Autonomic Nervous System

The autonomic nervous system consists of two branches that receive neural signals from several regions of the brain, including the cerebral cortex, the amygdala, and the hypothalamus. The function of the autonomic nervous system is to maintain conditions in the body through activities such as blood flow, glucose production, and digestion. The activities of these systems enable different kinds of actions, such as fighting and fleeing. The autonomic nervous system is regulated by reflexes. As such, it functions to control respiration, heart rate, and reflexive actions like sneezing, coughing, and swallowing.

All the changes that occur within the autonomic nervous system provide evidence for James's theory. The first piece of evidence comes from studies that look at how someone's body changes as a result of the facial expressions they make.

The facial action coding system, developed in the 1970s by Paul Ekman and Wallace Friesen, is an anatomically-based system that identifies the activity of facial muscle movements based on changes in the visible appearance of the face. It is also exhaustive of all possible combinations of facial muscle movements. In the facial action coding system, each muscle is given a number and one of five levels of intensity. This results in more than 2,000 potential combinations of facial muscle activity.

The facial action coding system has been a great tool for research. Because of the coherence between internal emotions and observable facial expressions, the facial action coding system provides an objective method of measuring emotional states.*

To create the facial action coding system, Ekman and Friesen had to spend thousands of hours moving their facial muscles and noting how those movements created wrinkles, dimples, bulges, and other visible changes in the face. One day as they were making sad facial expressions, they discovered that they were both feeling a bit down and began to wonder whether it was because they had spent the whole day making sad facial expressions.

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* Paul Ekman and Erika Rosenberg's *What the Face Reveals* includes several selected basic and applied research studies that have utilized the facial action coding system to measure emotion.

Both Charles Darwin and William James had hypothesized a bidirectional communication system between emotions and facial expressions: Certain facial expressions occur as a result of experiencing certain emotions, and certain emotions occur as a result of creating certain facial expressions.

To test this hypothesis, Ekman and Friesen teamed up with a scientist named Robert Levenson to develop the directed facial action task, in which they instructed participants to make specific facial muscle movements. For example, they might ask one of the participants to wrinkle their nose, raise their upper lip, open their mouth, and stick out their tongue. This is a prototypical expression of disgust. In addition to disgust, participants were instructed to make facial expressions of anger, fear, sadness, happiness, and surprise. Once the participants were able to make the expressions and hold them for 10 seconds, Levenson, Ekman, and Friesen measured their autonomic nervous system activity—specifically, heart rate, finger temperature, galvanic skin response,[†] and muscle activity.

They found specificity in autonomic nervous system responses to the negative emotions. First, they found that increases in heart rate occurred for fear, anger, and sadness, but not for disgust. Second, galvanic skin response was greater for fear and disgust than it was for anger and sadness. Finally, finger temperature was greater for anger than it was for fear.[‡]

The findings from this study have generalized to others. For example, Sylvia Kreibig reviewed more than 130 studies of autonomic specificity of emotions in 2010 and concluded that there are differences in the autonomic patterns of anger, disgust, sadness, and fear.

If deliberately creating the facial expressions that are characteristic of specific emotions can induce the feeling states of those emotions, can this be used effectively in real life to change how we feel? One of the distress tolerance skills taught in dialectical behavior therapy is the half-smile, which teaches clients to create a smile of medium intensity to get through difficult situations and to behave in ways that are in line with their goals.

[†] This measures the electric conductance of sweat glands.

[‡] This is because blood moves quickly to the palms when we're angry to prepare us for combat. In contrast, blood remains in the chest when we're afraid to support flight-related locomotion.

The Neuroendocrine and Immune Systems

The neuroendocrine system involves a network of glands distributed throughout the body that release hormones into the bloodstream. These include the pituitary gland and the reproductive glands. These hormones affect different organs and muscle groups and serve functions related to physical growth, homeostasis, and reproduction. Importantly, they are also linked to emotionally relevant behaviors.

The immune system functions to help the body fight infections and heal in response to injury. It is made up of a network of cells and glands distributed throughout the body.

How Emotions Affect the Body

In addition to positing that each emotion has a specific physiology, William James also argued that activating the body in ways corresponding to the specific emotions would create the experience of that specific emotion. This point was also made by Silvan Tomkins in 1962, when he asserted that the occurrence of an emotion corresponds in tune with the specific physiological state.

This idea has been tested in two ways. The first way is to find instances in which someone is experiencing a spontaneous emotion and ask them to report their subjective emotional experience. Here, the evidence for James's hypothesis is mixed. Generally, when people experience a spontaneous emotion and make the characteristic facial expression of that emotion, they also report experiencing that emotion. For example, people are more likely to report anger when they furrow their brow and tighten their lips. The data regarding bodily changes is where things get mixed. Some studies have shown a cohesion between bodily changes and the experience of an emotion. For example, some studies have looked at blushing and found that it is associated with the subjective reports of embarrassment. Other studies, however, have not shown an association with bodily changes and subjective reports. For example, changes in heart rate and/or blood pressure aren't associated with reports of distinct emotions.

The second way of testing James's hypothesis is to have people change their bodies in specific ways and then ask them about their emotional experiences as a result of these changes. The most notable of these studies was done by Strack, Martin, and Stepper in 1988. They had participants read a comic strip while holding a pen in their mouth. In one condition, participants held the pen between their teeth and pointed it to the right and to the left. This made the participants create the same muscle movement seen in a smile without them realizing it. In the other condition, participants held the pen between their lips and pointed it out. This made participants create a pouting expression without realizing it. The researchers found that participants who held the pen in their teeth facing to their left and right judged the comic strip to be funnier in comparison to those who held the pen in their lips facing outward.

However, a meta-analysis that included 17 direct attempts to replicate these findings only saw small and nonsignificant differences between the induced smile and the induced pout.

Emotions are for motivating actions, so it makes sense that they would be associated with bodily states that lend themselves toward specific actions. Often, the relationship between emotions and the body is an adaptive one to increase our reproductive fitness. However, our current environment elicits chronic emotional states that can cause problems, particularly regarding our bodies and physical health.

Our fight-or-flight system activates in response to a threat with the function of protecting us from that threat. The system does this by mobilizing the body in costly ways, downregulating any restorative systems that are not critical to addressing the threat, such as reproduction, repair, and growth.

This plays out with the emotion of fear and the mood of anxiety. Keep in mind that emotions are shorter in duration and have a specific and obvious cue, whereas moods are longer in duration and don't always have an obvious cue. An imminent threat (such as facing a predator or enemy) will likely induce fear, whereas the anticipation of a negative event (such as a long and cold winter with few resources) will likely evoke anxiety. Although fear and anxiety differ in important ways—such as whether the threat requires immediate or anticipated action—they share similar patterns of activation. This uniformed pattern of activation is great for mobilizing us to respond to immediate threats in the short term. However, it can cause problems when it presents chronically, as it often does in modern society. The responses to fear and anxiety in the peripheral nervous system (such as increased heart rate and shallow, rapid breathing) are linked to noradrenergic activity. And greater noradrenergic activity is linked to greater risk of cardiovascular disease. This is especially true for those with anxiety disorders. Fear and anxiety also trigger the release of cortisol. This is great in the short term, as it is associated with enhanced memory for threating events. It's problematic in the long term, however, as cortisol damages bodily tissue.

Similarly to fear and anxiety, there can also be negative health effects of anger, hostility, and aggression. These emotions have long been thought to contribute to cardiovascular disease and mortality.§

Finally, it has been demonstrated that negative affect and depression can adversely affect immune system functioning, sleep, appetite, weight, and motor behavior.

Cardiovascular results of anger, hostility, and aggression include increased blood pressure, atherosclerosis, coronary artery calcification, and mortality. As a comparison, these effects are similar to those of smoking. So, high levels of anger can be just as damaging to your body as cigarettes can be.

The negative physical effects of emotions call attention to the environmental differences between those that our ancestors experienced and those that we experience now. Frequent negative emotions and chronic negative mood states are the water that many of us swim in. And it's a water that we're not particularly well adapted for.

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§ In 2004, Boyle and colleagues found that hostility was strongly and independently associated with the development of coronary artery disease. Miller and colleagues found a similar result in a 1996 study.

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The Social Purpose of Emotions

The social functions of emotions allow us to interact with others in a way that leads to adaptive outcomes for ourselves and sometimes others. These functions are crucial in creating and maintaining social bonds and in dealing with and/or repairing the rupture of these bonds.

Types of Social Functions

Following from conceptualizations by Agneta Fischer and Antony Manstead, emotions have two types of social functions:

- The affiliative function motivates us to form and maintain positive social relationships. This function is common for positive feelings like love, happiness, affection, and gratitude. It's also associated with negative feelings like remorse, embarrassment, and sadness.
- The distancing function motivates us to maintain our sense of self-worth, personality, or control by establishing or maintaining our social position relative to others. This feature is common in disdain, rage, disgust, and schadenfreude.*

Balancing each of these functions is difficult, in part because they're often in opposition with each other. However, both are important. On one hand, we are motivated to behave in ways that maintain close relationships. This is of great importance and has been shown in research on self-isolation. It's also consistent with our intuitive ideas of solitary confinement, which is often recognized as a severe form of punishment. On the other hand, we are motivated to behave in ways that maintain our security and sense of self. These behaviors distinguish us from others. For example, we often need to avoid others who might pose a threat to our survival or reproductive success.

Those who argue that emotions have a social function do not also argue that emotions are always functional; that is, the argument does not posit that the social effects of emotions are always as one intends them to be. For example, anger, contempt, and hate may be useful if they allow us to stay safe from harmful relationships, but they can be socially dysfunctional if and when they are targeted toward those who pose no threat or have no power to harm us. The same can be said for optimistic feelings like pride, happiness, or love.

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* This means "being entertained by someone's adversity."

In these cases, cooperation and affiliation may not be possible, leaving distancing as our only option. The thought, then, is that each emotion serves a social purpose that is dependent on the goals of the person in the social situation—either aligning with or separating from someone.

The Affiliative Functions of Emotions

The way that emotions are felt and communicated to others depends in large part on the type of relationship. This reflects that fact that successfully forming and maintaining relationships depends largely on the emotions that promote closeness and avoid distance.

This is consistent with studies on the social impact of emotions on others or on interpersonal interactions. For example, evidence shows that frequency and intensity of emotional experiences and expressions increase when the relationship becomes more intimate.[†]

This is even true for negative emotions. Anger and hostility research has shown that people, particularly women, show anger usually toward those with whom they are intimate. It's also been found that physical aggression, especially in women, also takes place more within intimate connections. It's not known why this sex difference exists, but it turns out that the relationship works in the other direction as well; that is, the absence of emotion in relationships is related to decreased intimacy in the relationship.[‡] Going even further, it seems as though the suppression of emotion in close relationships may be dysfunctional.[§]

[†] A 2004 study by Clark and colleagues found that emotions were more often encountered and conveyed in romantic relationships in comparison to other types of relationships. Similarly, a 1998 study by Barrett and colleagues found that the more emotions were expressed about a specific person in diary entries, the closer the interaction with the person was.

[‡] A study by Gottman and Levenson in 2002 found that the absence of emotion among couples discussing situations of conflict was a significant predictor of divorce.

[§] Van Kleef and colleagues found that if one individual in a close relationship is asked to hide their feelings, the other individual feels less emotional aid and shows increased cardiovascular responses indicative of a stress response.

Another emotion that has been shown to have an affiliative function in close relationships is gratitude. Several studies have shown that expressing gratitude in response to a partner's actions leads to positive feelings of appreciation in the partner who receives the expression of gratitude. This appreciation then leads to feelings of increased security and value within the relationship.

Smiles and laughter also have an affiliative function. Research has shown that smiles increase the credibility of promises to cooperate.

Human laughter is a stereotyped, though not necessarily uniform, behavior that is universally recognized. These features suggest that it may be an adaptation. Humans can produce laughter spontaneously (in response to a stimulus judged to be humorous) or deliberately (on command). Spontaneous laughter is involuntary; that is, it's difficult to feign in the absence of humorous stimuli and difficult to suppress in the presence of humorous stimuli.

Even so, it is not intuitively obvious what the adaptive function of humor might be. At the proximate level, laughter is associated with the release of endorphins and a decrease in muscle strength. It is also associated with increased positive affect and decreased negative affect. As such, there is a commonly held belief that laughter functions to add levity to an otherwise selfish and competitive social landscape. However, this belief raises at least one additional question at the ultimate or evolutionary level: What recurrent problem(s) faced by our ancestors did laughter evolve to solve?

It is thought that laughter might serve an affiliative function. One affiliative function of laughter is to signal in-group membership. This has been tested in several studies that demonstrate that laughter is more frequent in response to in-group members in comparison to out-group members. For example, studies have examined the effects of canned laughter, which has been found to increase audience laughter.

A second affiliative function of laughter is to distance members of the out-group. The source of laughter often has a target, and it has been suggested that laughter is often used to ostracize or repel out-group members. Furthermore, it has been proposed that laughter in response to the misfortune of an out-group member can foster a sense of community when shared with in-group members. This notion is consistent with the finding that stronger in-group membership has been related to more positive perceptions of jokes targeting out-group members in comparison to jokes targeting in-group members.

Taken together, the research suggests that intimate and communal relationships involve strong emotions. The affiliative benefits of expressing these emotions also extends to relationships between strangers. For example, those who smile at strangers are perceived to be more kind, more humorous, more intelligent, and more honest than those who do not smile. It's important to note, however, that these perceptions are only made in response to those smiles that are perceived as genuine. A similar effect of gratitude has been found among strangers.

Not all positive emotions have an affiliative function. A noteworthy exception is pride, which is more likely to serve a distancing function.

Note that the distancing effects of pride only apply when the pride is expressed in relation to one's own attributes or achievements. Pride can still serve an affiliative function in cases where one shows it in relation to the attributes or achievements of others.

The negative emotions work a little differently for affiliation than the positive emotions do. The research points to three specific affiliative functions that negative emotions can serve: signaling, support, and social exchange.

- Signaling is communicating information about the state of the signaler that can affect the behavior of a receiver. A signal is any action or structure that affects the behavior of others, evolved because of those effects, and is successful because the effect has evolved to be affected by the action or structure. By nature, signals contain information that could enable receivers to reduce their uncertainty about states of the world. The use of another's facial expression to guide our actions has been seen as one of the mechanisms in which another person's actions can affect our own.

- In some situations, expressing negative emotions may not only signal that someone is in danger or vulnerable but may also help elicit support from that person. Support is when a specific type of behavior is elicited from the recipient. This support can be psychological, such as offering consolation or solutions, or it can be material, as in money. Research suggests that people are inclined to express many negative emotions after an emotional event. A great example of this is crying. Research on crying shows that people are more likely to cry in the company of those close to them. This is suggestive of a support function because those close to you are most likely to be motivated to help you when you're in need.
- Social change refers to the elicitation of a specific range of behaviors—namely, those that elicit a change in the target's behavior—with the aim of improving the relationship between the two. Here, the individual acknowledges their own wrongdoing with the intention of reaffirming or repairing their relationship with the other person. This is the social function of regret, embarrassment, guilt, and shame. People feel regret, for example, when they become aware of their own wrongdoing. Consistent with the social change function, the research on regret suggests that it motivates people to undo the wrong and repair the relationship.

The Distancing Functions of Emotions

While the emotions with affiliative functions can be thought of as socially engaging, those with distancing functions can be thought of as socially disengaging. These emotions include anger, contempt, fear, disgust, schadenfreude, and pride.

We often feel anger when someone is stopping us from reaching our goals. Anger motivates us to remove whatever obstacles are being placed in front of our goals—or, in some cases, the people who are putting those obstacles in front of our goals.

For this reason, many view anger as an approach emotion because we are approaching those who are impeding our goal-oriented behavior with either harm or the threat of harm. However, the view that anger is a socially distancing emotion comes from the idea that the goal of confronting or threatening an individual is ultimately to increase the distance between the self and the other person. In other words, the ultimate goal of behaviors motivated by anger are to pressure the other to apologize, yield, or otherwise stop blocking us from reaching our goals. This is consistent with work showing that expressions of anger result in great concessions from third parties.

The effects of angry facial expressions paired with threatening messages have also been tested in conflict situations. A person often makes a threat to commit to a harmful action against the recipient if their conditions are not met, even if following through with it damages the threatener themselves. Just like promises can easily be broken, a person who only states a threat is not too credible, especially if they would also suffer if the threat was realized, such as if they had to go to prison for assault. The emotion of anger might provide an extra guarantee that the threatener will actually do what they said, even if it leads to mutual destruction.

A study examining the effects of fearful facial expressions supported the hypothesis that fearful expressions increase the credibility of claims of danger specifically, rather than other messages, such as oppositely claiming no danger. This observation could point to a hidden cost of credible emotional expressions. Fear can bolster a claim of danger, but it might simultaneously make it more difficult to hide danger. For instance, smugglers of contraband could find it difficult to suppress emotions of fear when interrogated by the border patrol. In this way, fearful expressions that are designed to automatically and credibly signal a danger would also inadvertently give away the smugglers' hidden cargo. In such a case, where the expression of fear increases or decreases the credibility of an accompanying statement, there exists an effect on others.

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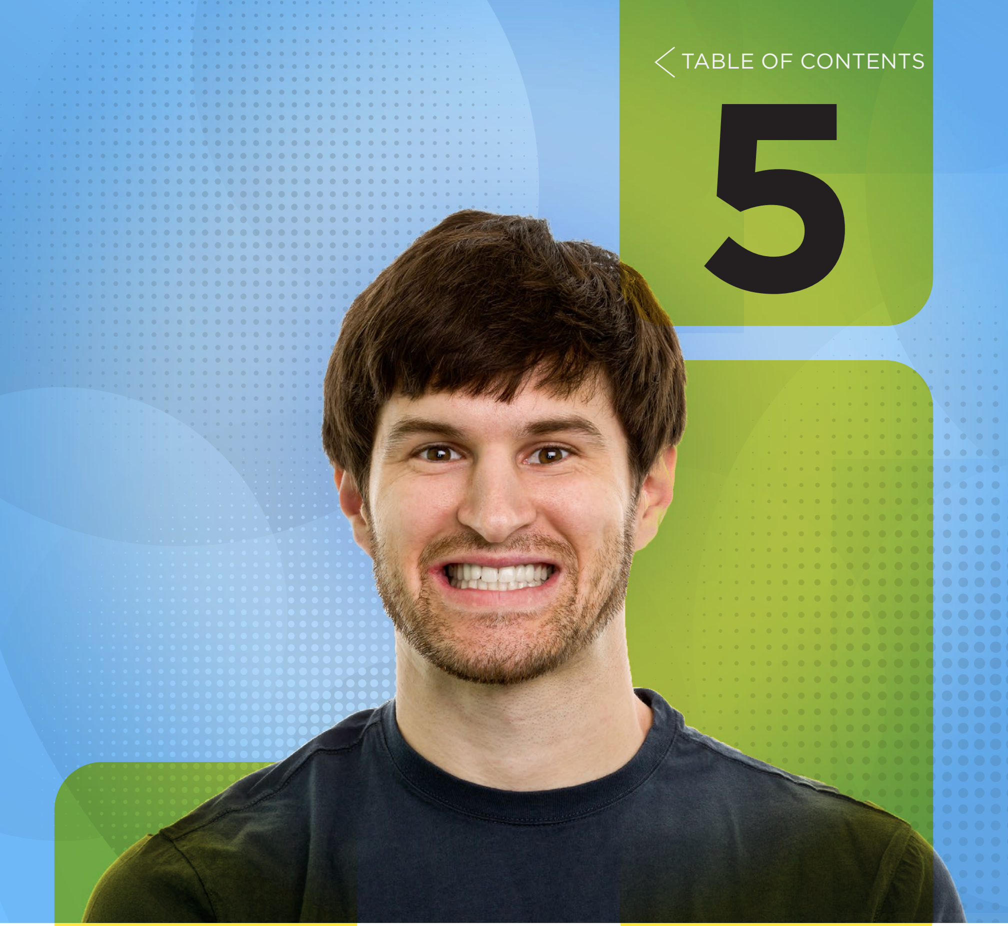

Facial Expressions and Nonverbal Behavior

There are many types of nonverbal behavior. Gazing, hugging, touching, smiling, and grooming are only a few of many more. Often these behaviors are associated with specific emotions or used to communicate those specific emotions.

Classification of Nonverbal Behaviors

To clarify which nonverbal behaviors are related to which emotions, Paul Ekman and Wallace Friesen organized nonverbal behaviors into five different categories.

- **Emblems** are nonverbal gestures that directly translate into words and have a specific meaning within a culture. For English speakers, this includes the thumbs up and the peace sign. No words are required for emblems to convey their meaning; their message is sent with the gesture alone.
- **Illustrators** are nonverbal gestures that accompany and embellish speech. They differ from emblems in that they don't have any specific meaning without the words they accompany. An example is raised eyebrows that emphasize a specific point.
- **Regulators** are nonverbal behaviors that are used to coordinate conversations and interactions. For example, head nods can be used to emphasize specific portions of speech. Regulators also include orienting our bodies toward and away from people to suggest turn-taking during conversations. These nonverbal behaviors come naturally to us; they are behaviors that we all know but have never been explicitly taught to us.
- **Manipulators or adaptors** are actions that manipulate parts of our bodies. These include scratching, rubbing, picking, and other similar behaviors.
- **Emotional expressions or displays of affect** are patterns of behavior in the face, voice, body, and touch that convey internal emotional states.

Emblems vary significantly across cultures. There are some emblems that have a meaning in one culture and no meaning in another culture. To make matters even more confusing, there are some emblems that have a meaning in one culture and a different meaning in another culture.

There are three different ways in which you can distinguish between a genuine expression of an emotion and a feigned expression of an emotion.

- Expressions of emotion tend to last just a few seconds. In contrast, other expressive behaviors can be very brief or last for longer periods of time.*
- Emotional expressions involve involuntary muscle actions. People have a difficult time deliberately producing these in the absence of an emotion and suppressing them in the presence of an emotion.
- Genuine emotional expressions have been found to unfold over time differently than feigned expressions. More specifically, emotional expressions have a more fluid onset and offset in comparison to feigned emotional expressions.

Darwin hypothesized that facial expressions were universal. He had two specific hypotheses: the encoding hypothesis, which stated that the experience of different emotions should be associated with the same distinct expressions in every culture; and the decoding hypothesis, which stated that people in different cultures should interpret facial expressions in the same way.

Paul Ekman and Wallace Friesen tested both of these hypotheses and found strong evidence for the universality of facial expressions of emotion. However, their findings created a longstanding debate among emotion researchers. Despite this controversy, facial expressions of emotion have been shown to reveal a great deal of information regarding internal emotional and motivation states. Just by looking at the face, you can tell what emotion is being expressed. Happiness, sadness, anger, fear, disgust, and contempt, for example, all have characteristic facial expressions of emotion. You can also tell the intensity of an emotion. By attending to the intensity of the muscular contractions, you can differentiate between a little bit of trepidation to outright terror.

We have an inability to control our facial expressions completely.

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* For example, a genuine smile typically lasts between four and six seconds. A social or feigned smile may either be exceptionally brief (lasting only a quarter of a second) or endure for a long period of time (lasting the duration of an entire conversation).

You can also tell if two emotions are blended together. So, you can differentiate between surprise and happiness, such as when you see your best friend, or surprise and disgust, such as when you see a cockroach. All this information can be gleaned simply by looking at the face—something that is so conspicuous that it can't be inconspicuously hidden.

The face is a dual processing system, which means that it's capable of producing both spontaneous, genuine expressions of emotion as well as deliberate, feigned expressions of emotion. This means that although people who study facial expression of emotion see it as having more veracity than self-report, we don't actually believe that the smiling flight attendant is happy to see us.

> **"We are about as effective at stopping an emotion as we are preventing a sneeze. We can try to prevent the expression of emotion, and we may succeed in part, but not in full."**
>
> —Antonio Damasio

It turns out that the rabbit hole goes even deeper. Spontaneous and deliberate facial expressions emanate from separate upper motor neuron pathways. Deliberately induced movements emanate from the cortical motor strip, whereas spontaneously induced movements emanate from the phylogenetically older extrapyramidal motor system. If you have damage to the cortical motor strip, you'll lose the ability to make a facial expression on command but retain the ability to make a spontaneous facial expression. On the other hand, if you have damage to the extrapyramidal motor system, you'll lose the ability to make a spontaneous facial expression but retain the ability to make a facial expression on command.

Furthermore, not all facial muscles are equally able to be controlled. There are specific facial muscles that Paul Ekman termed reliable. When it comes to these facial muscles, fewer than 10% to 15% of individuals can do these two things: contract these muscles in the absence of an emotion and suppress these muscles in the presence of an emotion. These reliable facial muscles include those that are present in many of the basic emotions. They include the inner eyebrow raiser. Most people can raise their inner eyebrow concurrently with their outer eyebrow. However, very few people can raise their inner eyebrow independently from their outer eyebrow unless they are genuinely fearful.

Why Emotions Are Tied to Our Faces

The face reveals a great deal of information, and facial expressions are difficult to fake. But why? Why are emotions so intimately tied to our faces and the way that we move them? Asked in a different way, what's the benefit of honestly advertising something as personal, subjective, and intimate as your emotional and motivational states someplace as conspicuous as the face? Wouldn't it be better to just keep our emotional states private?

The benefit to the person who sees the facial expression is clear. The receiver gets accurate information regarding the signaler's emotional state, which is tied to their action tendencies. But based on evolutionary theory and signaling theory, there needs to be a benefit to the signaler or the facial expresser him- or herself.

One of the answers that has come out of the research in this area is that facial expressions serve to advertise subjective commitments. There is a class of problems that the economist Thomas Schelling called commitment problems. Consider this example. A kidnapper suddenly gets cold feet. They want to set their victim free, but they're afraid that their victim will go to the police if they do. In return for their freedom, the victim gladly promises that they'll never go to the police. The problem is that both the kidnapper and the victim realize that it will no longer be in the victim's interest to keep this promise once the victim is set free. So, the kidnapper reluctantly concludes that they have to kill the victim.

How might you solve this problem? One solution is if the victim has committed an act whose disclosure could lead to blackmail, the victim might confess to it. If not, the victim might commit one in the presence of the kidnapper to create a bond that will ensure the victim's silence. Perhaps the victim could allow the kidnapper to photograph the victim in the process of some unspeakably degrading or embarrassing act. The threat of blackmail here serves as a commitment device—something that provides the victim with an incentive to keep their promise after they've been set free. Opening the threat of blackmail will certainly be unpleasant for the victim once they are freed, but clearly less so than not being able to make a credible promise in the first place and being killed.

These types of commitment devices are everywhere. And they work just as well when they commit us to specific actions as they do when they commit others to specific actions. For example, the best way to make sure that you actually get up on time is to voluntarily place your alarm clock on the other side of the room. There are even computer and phone apps that commit us to not wasting time using our cell phones.

One of Adam Smith's most enduring contributions as an economist and philosopher is his idea of moral sentiments, which are emotions such as anger, contempt, disgust, envy, greed, shame, and guilt. Smith argued that these sentiments function by competing with calculations stemming from rational self-interest. And it is for exactly this reason that they can help people solve commitment problems.

Consider a person capable of strong feelings of guilt. This person will not cheat on their partner even when it is in their material interest to do so—not because they fear being caught, but simply because they do not want to cheat. The aversion to feelings of guilt effectively alters the payoffs that they face; that is, they know that cheating will bring on awful feelings of guilt, which are so averse that they deter them from cheating in the first place.

The good feelings that we get by remaining faithful to our partners are, in a very real sense, their own reward. But we live in a material world, of material payoffs. And for these sentiments to be viable (that is, for them to have evolved via natural selection), they must have yielded some material payoff. Take guilt, for example. The potential gain of not cheating on your partner is to motivate them to engage in the cooperative venture with you. Not cheating is counterproductive after the fact. So, it's not enough for us to have these subjective commitments. They have to be honestly communicated for them to incur a benefit. And that is why we express them on our faces.

This idea provides an explanation for why emotions are so intimately tied to the body. It has been proposed independently by the economist Thomas Schelling; the evolutionary psychologists Robert Trivers, Martin Daly, and Margo Wilson; and the economists Robert Frank and Jack Hirshleifer. It goes by several names. The most common are the doomsday machine theory, the theory of mutually assured destruction, and the Frank-Hirshleifer hypothesis.

Lawrence Ian Reed and colleagues have tested this hypothesis over the past several years. In these studies, they have found that smiles honestly signal a commitment to behave cooperatively toward others, angry expressions honestly signal a commitment to behave spitefully toward others, sadness expressions honestly signal the need for help, and fearful expressions honestly signal the presence of danger. Each of these studies has demonstrated that people respond to these expressions differently in comparison to a neutral expression. Taken together with the theory that was just described, they strongly suggest that facial expressions honestly advertise subjective commitments.

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Self-Conscious Emotions: From Empathy to Shame

Before children develop the capacity for self-reflection, the emotions are action patterns mostly elicited by the physical properties of the literal and tangible world. However, once children develop the capacity for self-reflection, between 15 and 24 months of age, a new set of emotional action patterns arises. These emotions involve ideas about the elicitor of an emotion and about the self. It is these ideas that become the elicitors for a new set of emotions called the self-conscious emotions.

Two Types of Self-Conscious Emotions

Two types of self-conscious emotions are exposed and evaluative.

- The **exposed self-conscious emotions** are directly tied to representations that we have of ourselves in our minds. Each of them requires a mental representation of the self. Examples of these emotions are embarrassment, jealousy, and empathy.
- The **evaluative self-conscious emotions** require not only a mental representation of the self, but also knowledge or recognition of some standard, rule, or goal that we have acquired or achieved for our self. These emotions include pride, hubris, shame, and guilt.

The Exposed Self-Conscious Emotions

Although the emergence of self-reflection typically appears between the ages of 15 to 24 months of age, it always coincides with the appearance of the exposed self-conscious emotions. In other words, whenever a child attains a capacity for self-reflection, they also begin to experience the exposed self-conscious emotions. This is in contrast to emotions that are not self-conscious, such as fear, that are present before the emergence of self-reflection.

> **“Embarrassment reflects a failure to present oneself in the way one would have wished.”**
>
> —Robert Edelmann

Embarrassment is an exposed self-conscious emotion. Most agree that embarrassment is an unpleasant feeling that has to do with discrediting one’s image. This can be through the loss of self-esteem, the loss of the esteem of others, or both. Most of the disagreements regarding embarrassment revolve around the distinction between embarrassment and shame and between embarrassment and shyness.

Three features are necessary for embarrassment to occur in an individual: the presence of at least one person, awareness that the individual is the center of attention, and feeling by the individual that they are being judged.

The literature points to three characteristic nonverbal behaviors associated with embarrassment: a smile; an averted gaze, which functions to avoid eye contact with others;* and movement of the hands to the body, which can include touching the face, clothing, or hair.† These nonverbal behaviors can be simultaneously activated, or one behavior can follow from the others.

The nonverbal behaviors characteristic of embarrassment differ from those seen in shame, anxiety, and fear in several ways.

- The smiles associated with embarrassment are sheepish or silly. In contrast, smiles are not seen in shame, anxiety, and fear.
- The gaze behavior and bodily actions are also different in embarrassment. When embarrassed, you are more likely to tilt your head and avoid eye contact. This differs from the averted gaze seen in avoidance responses, which typically involves the head bowed. Also, the gaze aversion in embarrassment typically involves alternating between movements that avert the gaze from others and return the gaze toward others.
- The nervous touching behaviors seen in embarrassment seem to be associated with active self-reflection. This differs from those seen in shame and shyness, where the person is typically immobile and not inclined toward self-reflective behavior.

Embarrassment is an exposed self-conscious emotion, which means that you can become embarrassed merely by being exposed to others. There need not be any negative evaluation of you—only the exposure.

Jealousy is another exposed self-conscious emotion. Jealousy is often triggered by the loss of something valuable to another. Jealousy is often confused with envy, which is often triggered by wanting something that another person possesses. In either case, both jealousy and envy imply self-reflection. The person reflects on their self and what they don't have in relation to their self, so one has to be conscious to experience either jealousy or envy.

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* This might be because those who are embarrassed do not want for it to become common knowledge that they are embarrassed.

† These movements are thought to be nervous movements.

Another exposed self-conscious emotion is empathy. Although empathy has been studied for centuries, the concept has been rife with disagreement and confusion. The primary disagreement regards whether empathy is seen as an emotional or a cognitive process. Other disagreements regard how, or whether, empathy differs from emotional contagion, sympathy, and perspective taking. Some intuitive and abstract definitions of empathy emphasize putting oneself in the place of another; however, there's not yet a consensus on the term.

A common idea within the disagreements surrounding empathy is that it involves some ability to place oneself in the shoes of another person. This is inherently self-reflective because this ability requires a knowledge of oneself.

Empathy seems to be one of those constructs that we all intuitively know but have difficulty operationally defining. Jamil Zaki and Kevin Ochsner operationally define empathy as "the ability and tendency to share and understand the internal states of others." This definition highlights two distinct components: the sharing of others' experiences and the understanding of others' experiences.

- The sharing of others' experiences is the ability of the empathic person to take on the sensorimotor, visceral, and affective states of those who the individual is focusing on. There is substantial research within the psychological literature that demonstrates that people can take on the states that they observe in others. For example, individuals have the ability to mimic others' bodily postures and facial expressions, experience arousal of the autonomic nervous system when they observe arousal in others, and take on the moods of other people.
- The understanding of others' experiences, often termed mentalizing, is when the empathic person uses lay theories about the experiences that are present in specific situations to form an understanding of how the other person might be feeling in that specific situation. For example, we might recognize that losing a loved one might make someone grieve. When people mentalize, they are implementing this type of intuitive lay theory to make an educated guess of what the person in that situation might be feeling. This is a distinctly different component than simply paying attention to our own empathic experiences that are elicited by observing the experiences of others.

It's these two components—the ability to share others' experiences and the ability to understand others' experiences—that motivate the prosocial behavior that is characteristic of empathy. In other words, those who feel and understand the pain of others are often compelled to help those others.

The Evaluative Self-Conscious Emotions

We feel pride—an evaluative self-conscious emotion—when we judge an event to be successful and recognize our part in achieving that successful event. The phenomenological feeling of pride is positive and thus serves as a motivation for us to act in ways that elicit the feeling in the future. In this way, pride is similar to other achievement-related constructs, such as efficacy, mastery, and personal satisfaction.

Pride is demonstratively different from happiness and joy because happiness and joy don't require that we play a part in achieving the positive outcome.

Displays of pride have been studied by several researchers, including Jessica Tracy, Michael Lewis, and David Matsumoto. They've found that the feeling of pride and/or hubris is displayed by a facial expression of joy paired with the bodily movements of expanding the chest and raising the arms upward or outward.‡

Hubris is very similar to pride. In fact, the personal experience of hubris might be indistinguishable from the personal experience of pride for the person feeling either emotion. The difference is in what the feeling is in response to. Whereas pride is in response to a successful event that we have rightfully played a part in achieving, hubris is in response to a successful event that we have undeservingly given ourselves credit for.

Some research suggests that children can discriminate between pride and hubris.

Hubris can be thought of as a self-aggrandizing emotion, one in which people feel very good about themselves. Interestingly, work by Jessica Tracy and Christine Prehn in 2012 found that although the feeling of hubris is experienced as a high reward for the individual feeling it, it is unpleasant for those observing it and therefore is seen as socially undesirable.

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‡ It turns out that the display of pride is recognized across cultures.

It's also been suggested that feelings of hubris can lead to less effort, presumably because those feeling hubris feel as though they've already achieved the accomplishment. Thus, there are three problems that are associated with hubris: It is inherently a positive but transient and addictive feeling, is unrelated to the success and therefore underserved, and tends to interfere with social relationships because observers find it to be off-putting.

Shame is another evaluative self-conscious emotion that happens to be quite different from pride. While pride typically occurs when we recognize our part in achieving success, shame typically occurs when we recognize our part in failing to achieve success. As a result, the phenomenological and behavioral responses differ from pride.

Phenomenologically, shame is a negative and often painful experience. Behaviorally, there is a wish to hide, disappear, or die. This behavioral shrinking might take the form of lowering the shoulders and head. It is quite different from the behavioral expansion that accompanies experiences of pride. In shame, the behavior is a result of not wanting to be seen; in pride, the behavior is a result of wanting to be seen.

The biggest difference between shame and embarrassment might be that of intensity, with shame being the more intense of the two. Because shame is more intense, it is also more likely to be associated with disruptions of speech, thought, and/or movement in comparison to embarrassment. Moreover, shame can be experienced in both private and public. Embarrassment, on the other hand, is only felt with public events. That's not to say that we can't feel embarrassment when we are alone; if we do feel it when we are alone, though, it is likely to be in response to an imagined or implied audience.

Perhaps the most similar evaluative self-conscious emotion to shame is guilt. Both shame and guilt occur in situations when we recognize our part in failing to achieve success. The specific difference between shame and guilt lies in the cause of the failure to achieve success. With shame, the cause of the failure to achieve success is something inherent about the self. On the other hand, we feel guilt when the cause of failure to achieve success is due to our actions.

This distinction can have great consequences for future behavior. If we attribute the failure to achieve success to something inherent—to a stable characteristic of our self—it is less likely to motivate any corrective action. In contrast, if we attribute the failure to achieve success to our actions or behaviors, we can correct this failure in the future.[§] Furthermore, the possibility of corrective action seems to be related to the intensity of the guilt feeling. If there is no possibility for a corrective action, then the feeling can become more intense and more closely resemble shame.

[§] This is in part why major depressive disorder can be so debilitating. When we're depressed, we often attribute our failure to internal and stable factors that have global effects. Such attributions don't easily lend themselves to corrective actions, leaving us stuck in a vicious cycle.

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Culture and Emotions

Culture can be defined as a system of ideas and practices characteristic of, and common within, a society of people—a group of people defined either by the period of time or place in which they live.

How Emotions Differ across Cultures

There are at least three ways in which emotions are seen differently across cultures: how interpersonal they are, how active they are, and how closely they are based on values.

- Although it might seem obvious that emotions are relational—that is, that they occur in relation to other people—this isn't emphasized in Western cultures.* Of course, there are some emotions, such as joy as a result of eating a delicious meal, that occur in isolation. In cases like this, the emotion results from something physical. However, most human emotions are thought to be interpersonal. In other words, it is much more often the case that we feel happiness as a result of seeing a loved one after a long period of time.
- In Western cultures, we tend to view emotions as things that happen to us. For example, phrases like "she fell in love" or "he was consumed by jealousy" seem to assume that emotions are things that happen to us and that we experience them passively, without control. In non-Western cultures, people tend to think of emotions as active.
- A 2009 study by Bernard Rimé found that we tend to compare our emotions with those of others in relation to the values that are shared within that particular society. One implication of this is that there should be a relationship between the ways that emotions vary by culture and the ways that emotions are experienced by culture. In other words, the cultural variations in which values are prominent should in turn predict cultural variations in patterns of emotional experiences.

For more than a century, the study of emotions in psychology has tended to focus on the individual. This is likely because psychology as a whole tended to focus on the individual. However, the more current trend is to see the emotions as primarily interpersonal.

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* Western cultures are the exception.

Some would argue that emotions are culturally constructed to a great degree because the experience of most emotions are derived from human meanings, which are themselves cultural. Seen this way, emotions are like languages or art and differ widely across cultures. For example, is your experience of love the same as the experience of someone else who says they're in love but exists within a different culture? What about other emotions, such as happiness, sadness, or anger? These are the types of questions that those interested in culture might ask.

According to Batja Mesquita, a cultural approach to emotions focuses on the practice of emotion, rather than the potential for emotion. By *potential*, Mesquita means asking whether people of different cultures, if put in an appropriate situation, would be capable of showing certain universal emotional responses in terms of experience, expression, and physiology. Consistent with evolutionary approaches, the answer to this question is most likely yes.

There are two basic approaches to understanding the effects of culture on emotions.

- A cross-cultural approach examines how emotions differ across cultures. This approach can provide a direct comparison between cultures to examine the ways that they are similar and different.
- A multicultural approach looks within a multicultural society to see how people with different cultural backgrounds experience their emotional lives. Each person's cultural background has many elements, including ethnicity, country of origin, geographical region, social class, and religion. These elements, in large part, define our cultural identity. They also affect how members of different societies experience and express emotions in different ways.

In contrast to *potential*, *practice* refers to how people enact their emotions. This practice of emotion can differ drastically. Public expressions of anger are encouraged in some societies and discouraged in others.† Shame is another emotion that sees cultural variation. In Western cultures, shame is seen as damaging and is to be avoided. However, in more hierarchically structured societies, shame seems to be more valued. This is especially true when the shame is displayed by whoever is of the lower status in the interaction. Excitement, yet another example, is privileged as a pathway to happiness in some cultures. In other cultures, it leads to calmness and serenity. This led to the following observation from Mesquita and colleagues:

> People from different cultures appear to be similar in their emotion potential, especially when this potential is described at a higher level of meaning. Yet, despite the similarities in basic elements of emotional life, concrete emotional realities in different cultures may widely vary.

Self-Construal

One of the ways that concrete emotional realities vary across cultures is self-construal, which makes the distinction between an independent and an interdependent view of the self. This distinction can be seen in common expressions. In Western cultures, "the squeaky wheel gets the grease." In Asian cultures, "the empty wagon makes the most noise."

In the mid-1990s, psychologists such as Hazel Markus, Shinobu Kitayama, and Harry Triandis characterized these two types of self-construal-affecting emotions as independent and interdependent. Those with independent construals of themselves, common among those from Western cultures, tend to assert their individuality and define themselves according to the things that make them unique, such as their individual traits or preferences. Those with independent selves also focus on internal causes that are thought to be stable over time and that generalize to a variety of social contexts.

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† The Ilongots, a hunting society, encourage the expression of anger. In other societies, such as the Inuits, anger seems to rarely occur.

Those with interdependent construals of themselves are more likely to think of themselves as connected with other people, with an emphasis on the social context and situational influences. In contrast to those with an independent construal of themselves, those with an interdependent construal view themselves as always changing and shifting, depending on their contexts and relationships.

Culturally Relevant Knowledge Structures

In addition to self-construal, culturally relevant knowledge structures also affect the experiences of emotions. Several researchers have investigated the relationships between emotions and knowledge structures to examine how what we know guides our emotions. In this, they've compared East Asians and Western Europeans. East Asians are guided by a holistic and dialectic way of life that is influenced by Confucianism, Taoism, and Buddhism. This is based on five principles: change, contradiction, covariation, compromise, and context. In order, these principles state that

- nothing is static;
- opposites are often consistent, and both can be true;
- events are interrelated within complex systems;
- the truth may lie in the synthesis of opposites; and
- events and ideas never occur alone and cannot be interpreted outside of the relevant and proper context.

The adherence to these principles among East Asians, but not Western Europeans, has led to the hypothesis that, when compared with Western Europeans and Americans, East Asians might experience a greater level of emotional complexity, which refers to the simultaneous experience of contradictory emotions, such as happiness and sadness. This hypothesis would be consistent with the principles of contradiction covariation and in contexts that are seen in East Asian cultures. Some current findings suggest that the hypothesis might be true.

Specific Values

It turns out that cultural differences in specific values influence spontaneous emotional responses. A 2010 study by Iris Mauss and colleagues compared the responses of European American and Asian American college students when a rude instructor commented on their mistakes while doing a stressful task. They found that, even though the European American and Asian American students had similar physiological responses to the comments, the European American students expressed more visible anger in response to them. One interpretation of this difference is that spontaneous emotional expressions are valued more highly in Western European cultures because it is a means to express their authentic selves. In contrast, the Asian American students were more likely to inhibit their expression of anger because anger expressions risk disrupting social harmony.

This is related to affect valuation theory, which was proposed by Jeanne Tsai. The theory posits that emotions that promote cultural values are valued more and therefore play a more prominent role in people's lives. For example, excitement is valued in the US, where it enables individuals to pursue a cultural ideal of self-expression and achievement. In contrast, feelings of calmness and contentedness are valued in East Asian cultures, where these emotions enable people to fold into harmonious social relationships and groups.

Predictions based on Tsai's affect valuation theory have been tested, resulting in some important real-world implications. A 2015 study by Tamara Sims and Jeanne Tsai found that people who like to feel excitement were more likely to follow recommendations from a physician who expressed excitement. In contrast, those who liked to feel calm were more likely to follow recommendations from a physician who expressed calmness.

These findings are also related to those showing that Americans, compared with East Asians, are more likely to participate in risky recreational practices, more likely to advertise consumer products with intense smiles of excitement, more likely to get addicted to excitement-enhancing drugs, and prefer exciting rather than soothing music. The cultural difference regarding excitement seems to begin early. Children's books in America are more likely to feature highly excited protagonists when compared to children's books in East Asia. These same differences are found in other influential texts, such as the Christian Gospels and Buddhist texts.

The Evolutionary versus Cultural Perspective

How does this cultural perspective integrate with the evolutionary perspective that was discussed previously? Although the differences between these two perspectives might be most apparent, they actually show quite a few similarities. Both the evolutionary and cultural perspectives conceptualize emotions functionally as solutions to recurrent problems. Both suggest that these problems are often those that come about as a consequence of living socially. Both perspectives also assume that emotions help us form attachments with others, take care of offspring, take part in hierarchies, and maintain long-term relationships.

Perhaps the most important similarity between the cultural and evolutionary perspectives pertains to cooperation. Michael Tomasello argues that the adaptation of our species, which separates us from other species and defines who we are, is that we cooperate with one another. He argues that we cooperate in many ways, by making arrangements with one or a few others at a time as well as with society as a whole. The ways that we cooperate with society as a whole have come to be regarded as morality, or the ways of life that come to be cultures. From this perspective, many of our emotions serve the function of allowing for cooperation.

These include all the emotions involved in attachment, friendship, comradeship, companionship, and courtesy, which enable cooperation to occur. Other emotions relate to a desire to belong, such as guilt and shame. These occur when we don't manage to cooperate, and they function to motivate us to restore cooperative efforts.

There are, however, several differences between the evolutionary and cultural views. The first concerns the main question of what an emotion is. From the evolutionary perspective, emotions are universal, superordinate programs that coordinate the actions of many subprograms that function as adaptive solutions to recurrent problems faced by our ancestors. The evolutionary perspective argues that emotions are naturally selected, characteristic patterns of responses to specific situations. From a cultural perspective, the fundamental aspect of the emotional experience is how it unfolds within a specific social culture and is often seen in acts of communication. From the perspective of the cultural theorists, the most fundamental difference between their view and the evolutionary view is that they see emotions as socially learned in social practices, rituals, and relationships. And this social learning is based on culturally specific concerns about identity, social structure, and morality.

The cultural and evolutionary perspectives also differ in regard to ideas of function. From an evolutionary perspective, emotions function as solutions to recurrent adaptive problems faced by our ancestors. Recent evolutionary theorists have posited that emotions serve a communicative function through facial, vocal, and postural channels. In this way, emotions communicate information about current emotional states and action tendencies that help us navigate cooperative or competitive situations. Cultural theorists also have insights toward the social roles of emotions. However, these tend to focus more closely on how emotions serve functions for groups and societies as a whole, rather than an individual. They see emotions as helping to define values and enable group members to negotiate roles.

As with most views that share similarities and have differences, there is something to be gleaned from both the cultural and evolutionary views of emotions. The truth is likely somewhere in the middle.

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How Children Develop Emotions

As a child develops, there are systematic changes in their ability to signal their emotions and perceive the emotions of others. As they progress, so does the sophistication through which their emotional functioning does.

How Emotional Development Affects Social Interactions

As adults, we experience a wide range of emotions, such as fear of spiders and happiness toward those who help us achieve our goals. In many ways, our emotions are discrete, meaning that there are a small number of individualized, core emotions.

Carroll Izard suggested that we have discrete emotions that are present at birth. Then, changes occur over the course of development, including the emergence of locomotion, self-awareness, face processing, and the ability to theorize about the emotional states of others. The emotions are also shaped by culture and context. There is great interest among emotion researchers on how they unfold over time.

Are our emotion-related responses present from the start of life and then unfold over time? Or are our emotional tendencies shaped by the context around us—that is, our family, culture, and peer group? Or is it some combination of both? These questions comprise one of the central theoretical conundrums for those who study emotions.

One theoretical account on the development of emotions conceptualizes emotions as relational processes. These are processes in which children establish, alter, and maintain their relationships with the environment, which includes caregivers, siblings, and peers. This theory states that emotions are not just intrapersonal feelings that are communicated to others; they also play a role in shaping our interactions and relationships with other people.

More generally, emotional development takes place as children establish new ways of evaluating emotional events as their relationships with others change over time. These relationships unfold in both directions: Both the developing person influences those in their environment, and those in the developing person's environment influence them.

Emergence of Emotions across Early Development

We can think about the developmental emergence of emotions as a sequence of steps in building an emotional repertoire that will support a child's adult functioning. The scientific evidence to support the unfolding of these emotions and their expressions is based on studies of children's facial expressions of emotions. The facial coding systems that were developed for adults have been adapted for infants and children and can be used to examine whether they express emotions.

Crying is the first emotional expression to emerge, and it does so at the first moments of life. Crying is also a response to a wide range of stimuli in the infant or child's environment. As opposed to crying, satiation, attention, and interest in the environment represent a state of general pleasure.

As far as distinct or discrete emotions go, disgust occurs the earliest. It can be seen in newborn infants in response to sour tastes. The disgust expression is literally one that expels potentially noxious stimuli from the eyes, nose, and throat. It is similar in humans and other primates. The early appearance of disgust makes sense from an evolutionary perspective, as the disgust response can protect the infant or child by reducing their exposure to potentially life-threatening pathogens.

Babies begin to smile at around two months. Although babies occasionally smile during their first month, these smiles are often made during sleep and, for that reason, are not considered to be social smiles. Social smiles occur after the first month. In the second month, smiles occur with gentle stroking. By the third month, they occur frequently in interactions with caregivers. By the time the child reaches three months of age, they begin to smile in response to the same things that elicit smiles in older children—namely, attention from others, invitations to play, and even mastery of goals.

> Smiles are influenced not only by features of the social environment but also by heredity. The same is true with other emotional responses.

Not surprisingly, infant and child smiles are a delightful sight for parents and caregivers because they signal the beginning of a mutual and cooperative relationship. In response to infant and child smiles, parents and caregivers respond with talk, play, and interaction. This responsivity is key to early brain development, as well as the child's ability to understand others' minds.

Anger and angry facial expressions appear between the ages of four and 12 months. The appearance of anger is associated with the child's ability for means-end thinking, or goal-oriented thinking. The presence of anger suggests that the child has knowledge of both the goal and the fact that the goal is being blocked. Anger expressions increase as the child increases their autonomous crawling, which is associated with increased limit setting in parents and caregivers. This results in more anger as the child experiences increased attempts at blocking their goals.

A bit after anger and angry facial expressions begin to appear between the ages of four and seven months, expressions of sadness and fear emerge at around four months. At this age, children begin to expect that parents and caregivers will respond to their signaled needs. When this doesn't happen, sadness comes as a result. Children come across more danger and peril once they begin crawling, and this is associated with an increase of fear expressions.

So, within the first eight months, children begin to display smiles as well as expressions of disgust, anger, and fear. We begin to see more complex emotions that allow for increasingly complex social interactions as the child moves from infancy to preschool and school age. It is during this time that their emotional lives become more social and other-focused. Along with this comes the emergence of self-conscious emotions at around 18 months. These include embarrassment and envy as well as the prosocial emotion of empathy and sympathy-based altruism.

Along with the emergence of the prosocial emotions, there are developments in emotion expression that result from the child's increased ability to understand others. For example, between 12 and 24 months, children begin to respond to another's distress by comforting, bringing an adult, or offering a soothing object. Before 24 months, children tend to respond to others' distress as they would want to be tended to—that is, with objects. However, by three years of age, children begin to offer comfort that is specific to the needs of the other child, such as bringing their mother to them.

Also, during this time, three types of prosocial behaviors are seen.

- The first is offering instrumental help. This typically occurs before 18 months.
- The second is providing comfort. Toddlers at this age offer spontaneous instrumental help even when they gain nothing from this behavior.
- Finally, children begin to share. Sharing can begin before one year of age, but it has a developmental progression in the preschool years that is related to factors such as emotional rewards, the perceived distribution of resources, and competition.

Both consciousness and mentalizing abilities occur in the second year of life. These abilities involve two complementary processes. For consciousness, there must be an awareness of the self as it might be seen by other people.* This is particularly true for self-conscious emotions of embarrassment and shame. For mentalizing, children have to understand that others' experiences are subjective and differ from their own experiences.

More complicated emotions begin to be expressed between the second and third years of life. These include the self-conscious evaluative emotions that involve children's beliefs and reactions to their own selves. For example, if something good happens that reflects well on the child, they may feel pride. On the other hand, the child may feel shame if a negative event happens that reflects poorly on them.

The first signs of guilt and shame also appear at around two years of age, when children show gaze aversion and bodily tension when breaking a social partner's toy. Children of this age also try to make amends for breaking the toy, which is an action tendency associated with feelings of guilt.

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* Consciousness is typically assessed in the mirror rouge paradigm, in which children are marked with a spot of rouge and then look in a mirror. The idea is that if the child recognizes themself, they'll detect the mark and touch it. If the child does not recognize themself, they'll just look at the "other" person with the rouge mark as if they were someone else.

Emergence of Emotional Recognition in Others

It's been argued that the ability to recognize emotions in others is required for cooperative behavior toward shared goals. Also, as some have pointed out, the ability to express an emotion is useless unless others can recognize the emotion that is being expressed. For this reason, it's likely that the expression and the recognition of emotions coevolved.

A wide variety of methods have been used to test emotion recognition in young children, who can't simply self-report because they can't yet speak. One of the most commonly used methods is the habituation paradigm: Infants tend to look at patterns that are new to them for longer periods of time than they look at patterns that are familiar to them.†

Studies using the habituation paradigm have found that children begin to pick up information from others' faces. Other methods suggest that the ability to recognize voices and gestures appears at this time as well.

With regard to the ability to recognize faces specifically, using versions of the habituation paradigm, two- to three-month-old infants have shown the ability to discriminate between facial expressions of happiness, sadness, and surprise. The ability to discriminate between fearful expressions comes at four to six months.

The recognition of emotions—either through the face, voice, or gestures—depends on the maturing perceptual system. Newborn babies don't have the visual acuity to discriminate between subtle differences in facial expressions that are needed to recognize expressions of emotion. These develop over the first year of life.

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† The habituation paradigm exploits this tendency by presenting an infant with a picture of a facial expression until they no longer look at it. The infant is then presented with another smiling face along with a new facial expression (a sad face, for example). If the infant looks at the sad face more than the smiling face, this indicates that they can discriminate between the two expressions.

Note that the pattern in the ability to recognize these emotional expressions closely mirrors the pattern in the ability to express these emotions. Children begin showing fearful facial expressions at around four months.

Older children can be directly asked whether they recognize emotional expressions. By preschool ages, children have a modest ability to label photographs of facial expressions as either happy, angry, or sad. This is followed later by the ability to correctly label scared, surprised, and disgusted expressions. By school age (around age five), children are quite good at recognizing and labeling emotions of others.

While newborn babies don't have the visual acuity to discriminate between subtle differences in facial expressions that's needed to recognize the expressions of emotion, that isn't true for recognition of vocal expressions. From the moment children are born, their senses are equipped to process emotional information from human vocal expressions. A 2012 study found that newborns between one and five days old were able to differentiate between fearful, happy, angry, and neutral voices. Research shows that newborns can also discriminate between other infant vocalizations, such as an infant laughing versus crying.

What's more impressive is that 12-month-old babies can make distinctions between different vocal expressions of positivity—for example, whether something is funny or exciting—and associate these vocalizations with the circumstances that elicited them. This means that children are able, by 12 months, to think about the causes of emotion in another person.

In general, the ability to recognize facial expressions of emotion improves across development, though it depends in part on which emotion is being recognized.

There is comparatively less to say about postures and gestures than the recognition of emotion in the face and voice. However, studies of infants watching adults display specific emotional postures and gestures suggest that four-month-olds are not able to perceive the difference between fear and happiness based on body postures. By the time the child reaches eight months, this becomes possible.

This suggests that there is some developmental transition that occurs between four and eight months in the ability to process emotion from the body. It's also been found that infants as young as six and a half months can discriminate between happy and neutral body postures and that they prefer the happy postures to the neutral ones.

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The Rational and Moral Sides of Emotions

Traditionally—and perhaps intuitively—thoughts, reason, and rationality have seemed to oppose passions, feelings, and emotions. The notion that emotions are pointless, primitive, and reckless is a staple of Western philosophy, running from the Stoics to René Descartes and Benedict de Spinoza, who viewed the emotions as unruly passions that should be reined in by reason and morality. The same notion is found in the id and superego of Freudian psychology, and it continues today in some strands of behavioral economics and political psychology. They tend to view psychology in general, and especially emotions, mainly as a source of bias and error—the opposite of smart, rational, strategic moves. However, like all the contents of an evolved, living mind, emotions are purposeful algorithms.

Rationality

Emotions are essential survival tools for a human's challenging expeditions through rugged terrain with scarce resources—for a human who is stalked by predators and strangers, plagued by microscopic pathogens, haggled by merchants and partners, and tangled in political intrigues. For instance, fear protects us against predators and hazards, disgust steers us away from pathogens in rotten corpses and putrid water, and anger prepares us to fight for vital resources.

Emotions are rational in ways that should even impress an economist. In particular, emotions are designed to make good trade-offs between costs and benefits. For instance, the emotion of fear weighs the cost posed by a danger in proportion to the benefits of ignoring it so that we feel less fear of a danger when there are greater benefits of confronting it. For example, a person who is starving feels less fear when hunting dangerous prey, such as a poisonous snake or a massive elk.

Similarly, the emotion of disgust weighs the chance of exposure to pathogens against the benefits of eating questionable food, showing affection, or caring for a sick loved one. Hence, we feel less disgust about putrid water when we are dehydrated, about the saliva of an attractive mate, and about a festering wound when helping a loved one—because in these cases, the benefits partially offset the costs of pathogen exposure.*

There is an important respect in which emotions differ from prototypical rationality; namely, a person often does not know the underlying purpose of their emotion. For instance, before science discovered microorganisms, no one could have known that the feeling of disgust aims to prevent infection by pathogens. Still, in modern times, people feel disgusted toward things like a dead cockroach even if they have been informed that it has been fully sterilized.

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* For illustrating examples of trade-offs in fear and disgust, check out the popular television series *Naked and Afraid* about survival in the wilderness.

Moreover, our emotions can go against our conscious purposes. For instance, someone might wish to get on a plane, but they are prevented by a fear of heights. This could appear irrational, but if you think about it, the fear algorithm has made a very reasonable estimation that a height of 30,000 feet poses a great danger. It is not a purposeless and arbitrary urge but shows a clear goal of protection, albeit at odds with the person's goals.

We also cannot fault our fear mechanisms too much if they ignore our conscious beliefs. Though we might be correct about planes, our conscious beliefs are mistaken in many other matters of safety (climbing ladders, riding horses, challenging a powerful rival), and fear better protects us by overriding these foolhardy beliefs.

Herein lies the likely origin of the myth that emotions are irrational. It is not that our emotions are actually pointless but that we are often in the dark about their goals yet still under their sway. This creates the conscious experience that our mind has been hijacked by a powerful external force. In these cases, a person could say that they were overcome by irrational feelings, and this would be fairly accurate, since they do not understand them. They could convey the same message of incomprehension by saying that they were possessed by demons.

However, such an account is not suitable for scientific theories of behavior, which are tasked with understanding both conscious and unconscious mental processes. From a scientist's perspective, a person's emotions are quite orderly, purposeful, and intelligent. Their magnitudes and proportions fit closely to the urgency of the situation. To survive the rigors of evolutionary competition, emotions had to be smart, precise, and efficient in pursuit of goals, even if their aims can differ from our own.

One of the problems that we, and most other living things, face is that we have to achieve our goals in a complicated world with imperfect information. For example, imagine walking in the woods alone at night and hearing a tree branch snap 10 or 20 yards behind you. It could be a squirrel, in which case it would be best to continue walking, or it could be a black bear, in which case it would be best to run. In this case, you would feel an emotion—fear—which would motivate you to act in a certain way.

The key point here is that our emotions motivate us to act in ways that, averaged over the course of our evolutionary history, would best promote our survival and reproduction. In this way, emotions help direct our actions in situations with limited information. There are the quick and the dead. In the forest situation, emotions motivate quick action. Rationality, however, would require you to calculate the odds that a sound of that amplitude could come from a squirrel versus a bear, taking into account the relative frequency of squirrels and bears in the forest. Here, a rational actor would be dead even if they had a calculator to help speed the process along. With this view, it is not so much that emotions are irrational but that we can't find a fully rational solution to many of the problems we face in life. In this way, emotions are a step toward rationality.

Morality

Morality is a topic that has garnered much interest in the past decade. In this context, morality refers to judgments about what is right and wrong. Morality also refers to character and virtue, which form the bases of much of social life. Emotions, when functioning properly, act as guides that promote moral behavior.

This contrasts with the prevailing views of the past, which saw morality coming from cold and rational deliberation. Immanuel Kant, for example, said that sympathy should not be relied on in judgments of right and wrong because it is subjective, blind, and unreliable as a guide to moral judgment across contexts.

In 2001, Jonathan Haidt wrote a paper entitled "The Emotional Dog and Its Rational Tail," in which he argued that moral affects, such as sympathy, may sometimes be inputs to moral reasoning. He presented an argument against the view that people arrive at moral truths by rationality and reflection.

Haidt's model argued that moral judgments occur first by means of quick heuristic-appraisal processes. These are only later followed by slower and more deliberate secondary appraisals, which may then be followed by tertiary appraisals as well as discussions with others.

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Emotional Disorders: Anxiety and Depression

There are instances when an individual suffers from an emotional disorder, in which emotions can result in maladaptive thoughts and behaviors. Two disorders that are related to emotions are anxiety and depression.

Anxiety

Fear, or panic, is an alarm response when we perceive danger to be present. This involves a triggering of the fight-flight-freeze (FFF) response. Anxiety, in contrast, is a future-oriented mood state associated with preparation for possible harm. Anxiety involves the simultaneous excitatory and inhibitory input to the FFF mechanism when danger is perceived to be possible at a later time.

Both fear and anxiety have overlapping features: They both involve the perception of danger, and they both involve excitatory input to the FFF mechanism. They also have distinctive features. Temporally, fear is more immediate, while anxiety is both longer-lasting and future-oriented. In addition, fear involves only excitatory input to the FFF mechanism, while anxiety involves the simultaneous excitatory and inhibitory input of the FFF mechanism.

Anxiety is necessary. It is adaptive for us to have a healthy fear of some things, such as heights, venomous creatures, unfamiliar surroundings, whether our child is safe, etc. Too little concern can be disastrous. Without any concern, we'd fall of cliffs, end up with snakes in our beds, get lost, and lose our children. Anxiety motivates us to prevent these things from happening.

Differences between Emotions and Moods

Emotional responses are short-lived, lasting on a scale of seconds to minutes, depending on the emotion. Moods last much longer—on a scale of hours, to days, to weeks and months. For some, they can last a lifetime.

Emotions always have an apparent and obvious trigger. Moods, on the other hand, don't always have a known trigger. People can experience what is often referred to as free-floating anxiety, which is when you feel anxious and aren't sure why.

But while anxiety is necessary, it's hard to argue that anxiety doesn't also seem excessively unnecessary. It's the same necessary anxiety that causes us to lose our concentration during exams, refuse to fly on airplanes, and stumble over words when speaking in public.

So, how do we explain this apparent excess of anxiety? In other words, why would nature select phenotypes prone to excessive anxiety?

And why not be anxious all the time? If anxiety is useful, it might seem optimal to adjust the anxiety mechanism so that we are always anxious. Of course, this would be distressing. However, natural selection cares only about our reproductive fitness, not our happiness. The problem of pain is not a problem for the evolutionary theorist.

Nearly 20% of the population has had at least one clinical anxiety disorder, such as generalized anxiety disorder, panic disorder, or a specific phobia.

The reason that we are not always anxious is not because anxiety is maladaptive. We are not always anxious because experiencing anxiety has costs; namely, it uses extra calories, makes us less fit for many everyday activities, and damages bodily tissue. Part of the physiological response of anxiety is the release of cortisol, which is costly in many ways.

So, why is anxiety costly in these ways? Why does anxiety damage bodily tissue, for example? Imagine that we have a host of bodily responses that offer us protection against danger—bodily responses that are inexpensive (that is, not costly), are safe, and can be expressed continuously. Such responses include something like an increase in vigilance that doesn't disrupt greatly from whatever task we have at hand.

In contrast, those bodily responses that are expensive (that is, costly) are dangerous and cannot be expressed continuously. These expensive bodily responses are bundled up in an emergency kit of sorts—one that is only opened during crucial times when the benefits outweigh the costs of opening it. Some components of the anxiety response are kept sealed in the emergency kit precisely because they cause bodily damage. Expressing those components consistently would be cost-prohibitive.

All of this seems to make sense, with one big caveat: We seem to be unnecessarily anxious. In other words, these expensive components are often expressed when the benefits don't outweigh the costs. The emergency kit is opened before the emergency takes place.

If anxiety can be costly and dangerous, why isn't the regulatory mechanism adjusted so that it is expressed only when danger is actually present? The answer is that, unfortunately, it is not clear in every situation whether anxiety is needed.

The answer that Randolph Nesse put forth for the apparent excess of anxiety is called the smoke detector principle. The primary insight of this principle is that the cost of getting killed is enormously higher than the cost of responding to 100 false alarms. When your smoke detector goes off at home, it could be because your roommate burned the popcorn or because there is a potentially deadly fire erupting in your home. If the smoke detector goes off in response to the burned popcorn, it is an inconvenience, but certainly not a big deal in the grand scheme of things. You might lose some sleep or have to evacuate your apartment building.

However, if the smoke detector does not go off in response to a potentially deadly fire, you and/or your roommate could die. That is catastrophic. So, because of the vast difference in the weighing of these outcomes, we purposefully set our smoke detectors to be too sensitive.

Nesse argues that the same principle applies to our anxiety systems. However, it was not us who consciously decided to make the system too sensitive, but nature itself. Imagine that you are walking alone in the woods at night. It's very quiet and very dark. Suddenly, you hear a tree branch break about 10 yards behind you. It could be a harmless squirrel underestimating its weight while climbing a tree, or it could be a grizzly bear. If you become extremely anxious and run away in response to the squirrel, it is an inconvenience, but certainly not a big deal in the grand scheme of things. You might waste a few calories and risk tripping over something in your haste.

However, if you become extremely anxious and run away in response to the grizzly bear, you could save your life. That is huge, because survival is key. Like the smoke detector, nature selected for us to pay the inconvenient costs associated with a false alarm rather than paying the catastrophic costs associated with a false negative.

Depression

Depression seems to be not only unnecessarily excessive, like anxiety, but also unnecessarily prevalent.

According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, major depressive disorder is present when one meets five or more of the following nine criteria during the same two-week period. At least one of those nine criteria must either be depressed mood or loss of interest or pleasure. These criteria represent the signs and symptoms of depression:

- depressed mood most of the day, nearly every day, as indicated by either subjective report or observations made by others
- markedly diminished interest or pleasure in all, or almost all, activities most of the day nearly every day
- significant weight loss when not dieting or weight gain or a decrease or increase in appetite nearly every day

- insomnia (too little sleep) or hypersomnia (too much sleep) nearly every day
- psychomotor agitation or retardation nearly every day
- fatigue or loss of energy nearly every day
- feelings of worthlessness or excessive or inappropriate guilt nearly every day
- a diminished ability to think or concentrate or indecisiveness nearly every day
- recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide

There are several theoretical accounts for the presentation of depression. One is a behavioral model that was put forth by Peter Lewinsohn, who argued that depression is the result of a low rate of response-contingent positive reinforcement. The idea is that we feel depressed in situations in which we have put forth a great deal of time and effort without experiencing any reward. For example, one might get depressed if they work very hard all semester and still don't pass a class. In this situation, we are being taught, albeit erroneously, that the time and effort we put into things doesn't matter. Behaviorists call this extinction—when a behavior stops because it is no longer being reinforced.

Another model is an interpersonal model. It was developed by James Coyne and suggests that stressful life events lead to a display of depressive symptoms, the function of which is to both restore social support and gain reassurance regarding one's self-worth from others. In this way, depression can function to elicit altruistic or cooperative behaviors from others when we need them the most.

A third model is the cognitive model, proposed by Aaron Beck. This model states that we all have dysfunctional schemas, or beliefs about the world, that lead to negative thoughts about the self, the world, and the future—Beck's cognitive triad. An example of a depressive schema might be this: "If I am not loved and accepted by all human beings, then I am worthless."

For what reasons might nature have selected for individuals to be prone to such a constellation of signs and symptoms? A fourth model, the evolutionary model, provides a possible explanation. Nesse suggests that depression is nature's way of telling us that we are barking up the wrong tree. It's consistent with Lewinsohn's behavioral model but notes that this can be adaptive. For example, let's say that there were two of you—one who was prone to depression and another who was not—and both wanted to run for president of the United States. In light of this highly improbable goal, the two of you would no doubt experience setbacks. The version of you who was prone to depression might lose motivation, become hopeless about yourself and the future, and have a decrease in energy. In this, you might save energy that would otherwise continue to be wasted. In contrast, the version of you who was not prone to depression might soldier on and continue toward the improbable goal.

This model proposes that those who were prone to depression outreproduced those who were not prone to depression. However, for the depressive response to be effective, it would need to be properly calibrated. In other words, there needs to be a threshold past which the depressive response is activated. Nesse posits that those with clinical depression have too sensitive a depression threshold—so sensitive that the depressive response is activated not only in situations that are improbable and unrealistic but also in situations in which expending energy in light of setbacks would be likely to bear fruit.

This evolutionary model is consistent with the research on depressive realism. These studies find that people who are depressed have a lower opinion of themselves and of their prospects for success. Surprisingly, this assessment is more, not less, accurate. In this way, depression can tell us when to cut our losses—when our goals are unrealistic and when it's best to save our energy. It is also consistent with the finding that depression is more common during the winter months, when food is scarcer and moving about is more metabolically expensive.

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The Purpose of Disgust and Anger

Two specific emotions that have seen increased interest in the past decades are disgust and anger.

Disgust

Disgust has long been considered a basic emotion for several reasons. First, it's seen across cultures. This was first demonstrated by Paul Ekman and Wallace Friesen in their work in the 1960s and 1970s. Second, it has a distinct pattern of physiological activity. This includes nausea, vomiting, increased salivation, and activation of the autonomic nervous system, which is not under voluntary control.

The traditional theories have posited that disgust functions to reject harmful, noxious, or otherwise distasteful substances from entering our body. This is consistent with the facial expression of disgust, which literally acts to prevent potentially harmful stimuli from entering our eyes, noses, and throats. In 1941, Andras Angyal stated that disgust protects us against the threat of ingesting harmful substances, such as the bodily waste of humans or other animals.

In *The Expression of the Emotions in Man and Animals*, Charles Darwin described disgust as a response to "something revolting, primarily in relation to the sense of taste, as actually perceived or vividly imagined; and secondarily to anything which causes a similar feeling, through the sense of smell, touch, and even of eyesight."

One of the things that makes disgust so interesting, and so difficult to conceptualize and study, is that it is very heterogenous. In other words, disgust is elicited in response to a wide range of stimuli. For example, you might be disgusted by a cockroach scurrying across your kitchen table. Studies show that this response generalizes to those that pose no harm at all. For example, feces-shaped fudge, apple juice in bedpans, and sterilized plastic cockroaches all reliably elicit disgust in laboratory settings. You might also feel disgust in response to the idea of voting for a candidate whom you despise. Each of these stimuli elicits disgust, so any conceptualization of disgust has to account for disgust in response to each of these stimuli. It's a very difficult task, though some studies have shed light on it.

One of the most widely accepted models of disgust was proposed by Paul Rozin, Jonathan Haidt, and Clark McCauley (RHM). At its heart, the RHM model is based on an evolutionary, and thus a functional, viewpoint of disgust. It states that there is a core disgust that is elicited in response to potentially harmful or distasteful objects in the environment that might be unhealthy for us to be exposed to. From there, the model states that this core disgust has been co-opted to address specific functions. This leads to four total functions of disgust that account for the large variation of stimuli that can elicit disgust.

- The **core function** works to protect the body from being contaminated or harmed by potentially noxious and/or distasteful stimuli. This is elicited primarily by living things (such as parasites, pathogens, and dead corpses) and things associated with living things (such as feces, urine, saliva, semen, and sweat).
- The **animal-reminder function** is the disgust that protects us by reminding ourselves that we are animals. The function of this type of disgust is to protect the soul by denying our animal nature. Here, denying our animal nature also denies our mortality. This type of disgust is elicited by sex, bad hygiene, death, puncturing the skin, and objects entering the body. It's also elicited by body envelope violations, such as gore, wounds, and disfigurement.
- The **interpersonal function** is elicited by contact with those who are undesirable and functions to protect the soul and social order.
- The **moral function**, like the interpersonal function, also protects social order and the soul but is elicited by moral offenses.

The evolutionary psychologists Joshua Tybur, Debra Lieberman, and others have identified several shortcomings of the RHM model that they think need to be addressed to create a more robust model of disgust.

The first shortcoming is that the animal-reminder disgust is said to be uniquely human and functions to "protect the soul." However, many nonhuman animals avoid corpses. Corpse avoidance among nonhuman animals functions to protect against infectious microbes, such as parasites and pathogens, that either killed the animal or are colonizing in the corpse itself.

Furthermore, the assumption that anything that reminds us that we are human elicits disgust seems questionable. Nonhuman animals often behave in ways that are like humans but don't elicit disgust. For example, nonhuman animals run like humans, breathe like humans, and sleep like humans. But none of these behaviors elicit disgust. And some elicit emotions that are quite dissimilar to disgust—for example, awe and/or empathy.

The second shortcoming of the RHM model that Tybur, Lieberman, and colleagues point out is that its definition of disgust is seemingly circular; that is, disgust is both the reason for the response (the elicitor) and the response itself (the output). From the RHM model, the animal-reminder function of disgust suggests that people feel disgust in response to stimuli that remind people that they are animals. The difficulty here is that the disgust response also serves as the criteria for the stimuli.

In response to the shortcomings of the RHM model that Tybur, Lieberman, and colleagues have identified, they proposed an adaptationist view from an evolutionary perspective. Their view accounts for the great heterogeneity in the functions of disgust without the shortcomings they view in the RHM model. The essence of their model is as follows: Instead of serving functions related to protecting the soul and avoiding reminders that we are animals, as suggested in the RHM model, disgust evolved to motivate behaviors that solve three distinct adaptive problems, which define the different types of disgust.

- **Pathogen disgust** is a solution to the adaptive problem inherent in avoiding substances in the environment that cause diseases.
- **Sexual disgust** evolved to motivate us to avoid sexual partners and behaviors that reduce one's long-term reproductive success.
- **Moral disgust** motivates behaviors that avoid those individuals who might inflict social costs on us or those within our social network.

So, Tybur, Lieberman, and colleagues' adaptationist view of disgust posits three types of disgust: pathogen, sexual, and moral. Each is elicited by different cues, and each motivates the appropriate behavioral response. Despite these differences, each seems to activate the same underlying emotion, as defined by studies measuring self-report and physiology.

Anger

Anger, like all the other emotions, has clear adaptive functions that help us in our everyday lives. As all the emotions do, anger helps organize our psychological and physiological processes to motivate us to behave in specific and goal-directed ways. Despite these clear adaptive benefits of anger, it's the emotion that many associate with maladaptive outcomes.

There are stacks of popular books that focus in large part on ways to control the effects of anger.

There are, in fact, negative consequences of anger, including interpersonal violence and coronary heart disease. Perhaps this is why anger, maybe more so than any other emotion, is often attempted to be controlled or mitigated—to reduce the negative interpersonal and physiological consequences that might result from it.

Anger, like many other emotions, has a characteristic facial expression associated with it. This involves the inward and downward movement of the inner eyebrows and the raising of the upper eyelids that create the pointed glower that is often directed at the elicitor of the anger. In addition, the nostrils might dilate, and the wings of the nose might flare out. The lips are often opened, specifically showing off the incisors and clenched teeth. The face may also flush red. This combination of facial actions is unmistakable and portends the threat of attack that is more likely to follow.

Regarding the cause of anger, it's generally agreed on that anger is elicited in response to either physical or psychological restraint or from blocking goal-directed activity. Here, a goal is any sought-after outcome of personal significance. However, some theorists have a broader definition of a goal. They would argue that a goal can be any desired outcome, ranging from the fulfillment of basic needs to achieving long-term secondary goals. In addition, there are several theoretical approaches that vary on this idea in other ways.

The first is the behavioral approach toward anger. From a behavioral perspective, emotions arise from reinforcement and punishment. And the specific emotion we feel is determined by those consequences. In the case of anger, similar to frustration and rage, it is the result of the omission or termination of positive reinforcers.

Another behavioral model posits that any unpleasant event causes negative emotions. These negative emotions are tied to a fight-or-flight response. Using this model, Leonard Berkowitz posited that the nature of the unpleasant event causes the negative emotion. If the unpleasant event is associated with a desire to escape a situation, then the negative emotion will be fear and the motivation will be to flee. On the other hand, if the unpleasant event is associated with a desire to attack, then the negative emotion will be anger and the motivation will be to fight or threaten.

The second approach to the causes of anger is cognitive and focuses on the appraisal of a situation. This approach posits that it is not the event but the appraisal of the event—meaning the interpretation, evaluation, or judgement of the event—that causes an emotion. According to the appraisal theories, we are constantly judging situations, often unconsciously, which results in various emotions.

The cognitive theorists argue that anger is the unpleasant emotion we feel when we appraise the situation as one in which our goals are being blocked. This isn't necessarily at odds with the behavioral approaches, since the appraisal of the blocked goal may be the evaluation of either the absence of reward or the presence of punishment—either of which can block us from achieving our goals in specific situations.

There have been some criticisms of the appraisal theorists' explanation of anger. The most commonly cited is that the emotion could be the cause of, rather than the result of, appraisals. For example, Berkowitz proposed in 1989 that the physiological fight system of anger is first activated. Then, the person makes an appraisal of the situation and engages in other cognitive processing to determine whom and how to attack. This idea suggests that the anger serves as the more basic response that then serves to organize other mental and physiological systems. If Berkowitz and others are correct, this means that an individual might feel anger and then search for someone or something to blame.

Based on the idea that there are appetitive and aversive systems that motivate core elements of behavior, psychologists who study emotion often delineate between those emotions that are appetitive, incentive, and approach with those that are aversive, avoiding, and withdrawing. For emotions, these are often categorized as approach-related and avoidance-related emotions.

There has been some debate regarding whether anger is an approach-related emotion or an avoidance-related emotion. On the surface, anger might be seen as an approach-related emotion. This is because, in order to stop someone from blocking your goals, you must first approach them.

However, there are also reasons to think that anger is an avoidance-related emotion. Some of these reasons are because of the close relationship between anger and fear, which are both related to the fight-flight-freeze response. The existence of this singular response suggests an association between the two actions. It also suggests that there might be contextual factors that can discriminate between whether fight or flight is the appropriate action. In this view, both fear and anger arise from the aversive motivational system.

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Connecting People: A Focus on Love

Love is something that most of us, for better or worse, have experienced in our lives. Yet it is one of those feelings that is extremely difficult to put into words. Perhaps that's why we value the poets, songwriters, and other artists who are able to capture the experience with a single metaphor, aphorism, or image.

Romantic Love

Being in love is like someone living rent-free in your mind.

According to the anthropologist Helen Fisher and the psychologist Dorothy Tennov, there are seven features of romantic love:

- **Intrusive thinking**. This is similar to a clinical obsession. When people are in love, they often can't stop thinking about the person with whom they are in love.
- **Aggrandization of the loved person**. When we are in love, we tend to accentuate the positive aspects of the loved person. We ignore their flaws. And if we happen to notice them, they are brushed off.
- **Looking for clues**. At least in the early stages of love, we become hyperaware of any potential evidence of the other person's feelings toward us.
- **Intense energy**. When people are in love, they can talk until the sun comes up. Sometimes they don't sleep or eat. In this way, being in love is like being hypomanic.
- **Mood volatility**. People in love are on a constant roller coaster. When things are going well, you're on the way up and feel like the luckiest person alive. When things aren't going well, you're on the way down and feel subjected to the worst feeling imaginable.
- **Sexual desire**. This is one of the of the aspects that distinguishes romantic love from companionate love. Here, sexual desire also often includes a desire for sexual exclusivity.
- **Lack of control**. You can't simply turn your love on or off like a faucet. And if you could, would anyone feel secure in your love for them?

The economist Robert Frank argues that irrationality is another essential feature of love. He also says that finding a husband or wife is like finding an apartment.*

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* This notion was further argued by the Harvard psychologist Steven Pinker in the book *How the Mind Works*.

Social scientists and veterans of the singles scene agree that dating is a marketplace. In other words, people differ in their values as potential marriage partners. Most people agree that Mr. or Mrs. Right should be attractive, smart, kind, stable, funny, and rich. And people shop for the most desirable person who will accept them. This is why most marriages pair two individuals of approximately equal desirability.

Somewhere in the world of about 8 billion people lives the best-looking, richest, smartest, funniest, and kindest person who will settle for you. An exhaustive search for this person, even if it was possible, would not be practical. You'd die long before you were able to evaluate all the potential partners out there. Meanwhile, staying single has costs—namely, loneliness, childlessness, and playing the dating game. So, at some point, it pays to set up house with the best person you have found so far.

The problem is that this calculation leaves your partner rather vulnerable. There are about 8 billion people in the world, and probability says that you will eventually meet a better person. It may be difficult to come to grips with, but there is someone out there who is just like your partner—but smarter. Or funnier. Or richer. This person exists, and it's only a matter of time before you run into them.

If you are going for the best that you can get, you will dump your partner the minute that you do run into them. Your partner has invested time, money, and child-rearing and forgone opportunities to be in the relationship with you.

If your partner were the most desirable person in the world, they would have nothing to worry about because it would never be rational for you to desert them. But the chances are that they are not the most desirable person in the world. And if they aren't, then your partner would be foolish to enter the relationship with you.

A similar problem exists in the rental housing market. Both parties, the landlord and the tenant, have costs. Landlords pay the cost of having an empty apartment, and tenants have the cost of homelessness. Both parties settle because exhaustive searches aren't possible or practical. Landlords desire the best of all tenants but settle for the best they can find. Renters want the best of all apartments but settle for the best they can find.

Both parties would also be harmed if the other suddenly terminated the agreement. If the tenant left for a better flat, the landlord would have to bear the costs of an unrented unit and would have to search for another tenant. If the landlord could evict the tenant for a better one, the tenant would have to search for a new home and would be willing to pay only a very low fee.

If the best tenant were renting the best apartment, their worries would be moot. In this rare case, it wouldn't be rational for either to end the relationship. This is a very rare case, though.

The solution to this problem is signing a lease. Since both parties have to compromise in the rental housing market, they can protect themselves by signing a lease that is expensive for either party to break. Leases work by voluntarily and irrevocably restricting your own freedom of choice. But this lack of freedom works to each one's advantage: The tenant can't leave anytime they want, and the landlord can't kick them out anytime they want.

There is a similar solution in the dating marketplace: marriage. Marriage laws work like leases. Getting married is basically saying, "I'm going to make it really difficult for me to leave you if you make it really difficult for you to leave me."

But what did our ancestors do to commit themselves before marriage laws existed? In other words, what could you do to relieve your partner of the vulnerability that exists with the possibility of you leaving the minute that it is rational to do so (say, when a 10 out of 10 moves in next door)?

> **"People who are sensible about love are incapable of it."**
>
> **—Douglas Yates**

The solution is simple: Don't accept a partner who wanted you for rational reasons to begin with! You accept a partner who wanted you for irrational reasons. You look for a partner who is committed to staying with you because you are you and there is no other you. You look for a partner who is committed by an emotion that they did not decide to have and cannot decide not to have—an emotion that was not triggered by your objective mate value and thus will not be alienated by someone with a greater mate value.

The crucial point is that the worry that people will leave relationships because it may later become rational for them to do so is largely erased if it is not a rational assessment that binds them in the first place. This also implies that there is nothing worse than saying to your partner that you love them because of any objective or rational trait they might have, such as their IQ or looks. This is because there's always someone out there who earns more, is smarter, or is more attractive.

Companionate Love

There's another common feature of love that often takes people by surprise: It tends to be fleeting. Sometimes, though, romantic love can mature into a different form of love, which psychologists call companionate love. This is a less exhilarating form of love than romantic love but in many ways is more real.

The love behind close friendships is neither romantic nor sexual. Friends feel like they are in each other's debt. These debts are not measured in the front of the mind but in the back of the mind. Moreover, the obligation to pay these debts is not onerous or filled with resentment. It's deeply satisfying. It is, in a very real sense, its own reward.

People feel a spontaneous sense of pleasure in helping a friend in need without expecting or anticipating any type of repayment. Of course, these favors are tabulated somewhere in the back of the mind. If the ledger becomes too lopsided, a person might call in the debt or cut off the relationship. However, the line of credit is long, and the terms of repayment are forgiving. Companionate love is like an elastic version of tit for tat in which emotional guarantors are stretched to the limit.

"Love is a gross exaggeration of the difference between one woman and another."

—George Bernard Shaw

From an evolutionary perspective, why did companionate love evolve? What recurrent problems faced by our ancestors does it solve? The evolutionary psychologists John Tooby and Leda Cosmides suggest that it evolved to solve what they call the banker's paradox. They note that a bank will lend you exactly as much money as you can prove that you don't need. The banks say that they only have so much money and that every loan is a gamble.

Tooby and Cosmides argue that the same logic applies to altruism among our ancestors. Here's the thought. A potential altruist has at least two worries. The first is about cheaters—potential beneficiaries that are not willing to repay. The second worry is about bad credit risks. These are potential beneficiaries who may not be able to repay. For example, if the recipient gets injured or dies, the altruistic favor given to them would have been wasted.

"The heart has its reasons which reason knows nothing of."

—Blaise Pascal

What kinds of strategies might evolve as a kind of insurance in which other people would extend "credit" to you even if some misfortune were to make you a risk?

One strategy is to make yourself irreplaceable. This can be done by, for example, cultivating expertise in an area that no one in the group can duplicate, such as toolmaking or conflict resolution. If you're irreplaceable, you make yourself costly to abandon in times of need. Everyone will depend on you too much to risk letting you die. This makes intuitive sense. People today spend a lot of time publicizing their unique and valuable talents.

The function of this is to look for a clique in which these talents are unique and valuable. Here, the quest for status is in part a motive for making oneself irreplaceable.

Another strategy is to associate with people who benefit from the same things that benefit you. Let's say you have a roommate and the two of you need to decide where to set the thermostat. If you prefer the temperature to be 70 and your roommate prefers it to be 60, then the two of you will have to compromise at 65. However, if you both prefer the temperature to be 70, then you'll be benefiting your roommate just by setting the thermostat as you want it to be.

In this example, you deliver a benefit without incurring a cost. Your roommate does, too. In this way, the benefits that you give to one another are simply side effects of the benefits that you're giving to yourself! In this way, roommates who prefer to keep the apartment at the same temperature are like symbiotic pairs: Each can value the other without an exchange of favors.

Furthermore, once you have made yourself valuable to someone, the person becomes valuable to you. You value them because if you were ever in trouble, they would have an admittedly selfish stake in helping you. Now that you value the person, they should value you even more. Not only are you valuable because of your talents or habits, but you are also valuable because of your stake in rescuing them in hard times. So, the more you value the person, the more the person values you. This runaway process is called friendship.

This solution isn't without its potential problems. Friendships, like other forms of altruism, are vulnerable to cheaters. These so-called fair-weather friends are only there for you only during good times and are nowhere to be found when the going gets rough. These sham friends reap the benefits of associating with the valuable person. They also often mimic signs of warmth in an effort to become valued by the person.

The good thing is that we've evolved an emotional response to weed out sham friends. When we are the neediest, the extended hand is deeply affecting to us. The hard times show us who our real friends are. That's because the function of friendship, evolutionarily, is to save you in hard times when it's not worth anyone else's trouble.

Quiz

1. **Which of the following people thought that the emotion itself is the pattern of responses in the body?**
   - **a.** Charles Darwin
   - **b.** William James
   - **c.** Sigmund Freud
   - **d.** John Bowlby

2. **When experiencing a(n) ___________, we are always aware of what triggered the feeling.**
   - **a.** emotion
   - **b.** mood
   - **c.** both of the above
   - **d.** none of the above

3. **Which of the following refers to inherited and reliably developing characteristics that came about as a characteristic of a species through natural selection since it facilitated reproduction directly or indirectly during its evolution time?**
   - **a.** adaption
   - **b.** adaptation
   - **c.** species
   - **d.** trait

4. **Which of the following people argued that many different emotions involved the identical general activation of the sympathetic nervous system?**

   a. William James
   b. Walter Cannon
   c. Charles Darwin
   d. Paul Ekman

5. **Which of the following involves a network of glands distributed throughout the body that release hormones into the bloodstream?**

   a. the HPA axis
   b. the neuroendocrine system
   c. the pituitary gland
   d. the pineal gland

6. **Which of the following is not one of the specific affiliative functions that negative emotions can serve?**

   a. signaling
   b. communicative
   c. support
   d. social exchange

7. **Physical aggression is more likely to take place in intimate relationships than distant relationships.**

   a. true
   b. false

8. **___________ are nonverbal gestures that accompany and embellish our speech.**

   a. emblems
   b. illustrators
   c. both of the above
   d. none of the above

9. **There is no evidence that facial expressions are universal.**

   a. true
   b. false

10. **Which of the following emotions is an unpleasant feeling that has to do with discrediting one's own image?**

    a. schadenfreude
    b. shame
    c. guilt
    d. embarrassment

11. **Which of the following terms has also been used to describe theory of mind?**

    a. social intelligence
    b. mentalizing
    c. cognitive empathy
    d. all of the above

12. **People in Western cultures tend to view emotions as things that happen to them.**

- **a.** true
- **b.** false

13. **Affect valuation theory posits that emotions that promote cultural values are valued more and therefore play a more prominent role in people's lives.**

- **a.** true
- **b.** false

14. **Babies begin to smile at around six months of age.**

- **a.** true
- **b.** false

15. **Emotion regulation can be __________.**

- **a.** interpersonal
- **b.** intrapersonal
- **c.** both of the above
- **d.** none of the above

16. **The smoke detector principle has been used to explain __________.**

- **a.** depression
- **b.** anxiety
- **c.** borderline personality disorder
- **d.** none of the above

17. **Disgust is a homogeneous emotion.**

- **a.** true
- **b.** false

18. **Anger has been considered an ___________ emotion.**

- **a.** approach-related
- **b.** avoidance-related
- **c.** both of the above
- **d.** none of the above

19. **John Tooby and Leda Cosmides suggested that ___________ evolved to solve the banker's paradox.**

- **a.** romantic love
- **b.** companionate love
- **c.** both of the above
- **d.** none of the above

20. **Robert Frank suggested that ___________ is an essential ingredient of romantic love.**

- **a.** companionship
- **b.** irrationality
- **c.** improbability
- **d.** infallibility

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ANSWERS

1:b	**2**:a	**3**:b	**4**:b	**5**:b	**6**:b	**7**:b	**8**:a	**9**:b	**10**:d
11:d	**12**:a	**13**:a	**14**:b	**15**:c	**16**:b	**17**:b	**18**:c	**19**:b	**20**:b

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